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NEWSPAPER

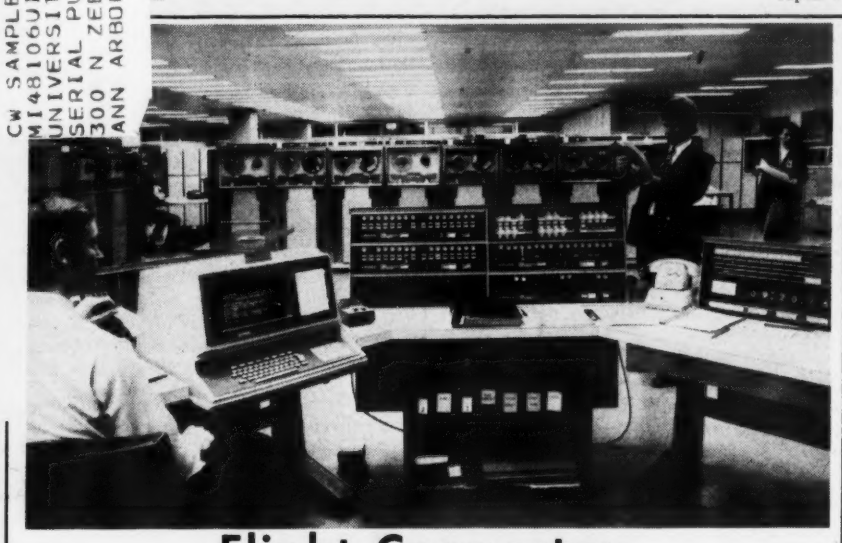
COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

Second-class postage paid at Boston, Mass., and additional mailing offices

ar April 11, 1973 Vol. VII, No. 15



Flight Connector

Dual Univac 494 CPUs in Frankfurt, Germany, store flight information on Lufthansa and 28 other airlines. More than 1,000 Uniscope displays access the system from the U.S. and Europe for information relating to passenger check-in, air route planning, operations control, connecting flights and reservation confirmations.

Antitrust Hearings Told

Outmanned Justice Needs $

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. – The Antitrust Division of the Justice Department is "outmanned and outgunned" when it comes to prosecuting cases like the current action against IBM, Senate investigators were told here last week.

In addition, witnesses before the Senate Antitrust and Monopoly Subcommittee stated that often the division cannot do its job properly in such cases because of political pressure from the White House. They also called for increased funding for the Antitrust Division.

Noting that IBM alone spends more for legal services each year than the Antitrust Division does with many different cases, witness Robert Beshar, a former deputy assistant secretary for Commerce, said the "Antitrust Division is woefully understaffed" and warned that the power of the White House "has seriously undermined the Antitrust Division's authority."

It is small wonder, he said, that "when push comes to shove, the division often lacks the muscle" to vigorously pursue such cases as the one brought against IBM.

"The IBM case is routinely called the day's most important case in modern times," he added. "That is probably true.

"But what is also probably true is that the public has little belief that the case has been prosecuted vigorously so far or that it will ever be heard or that there will be substantial relief when it is all over."

Beshar was one of several witnesses called in the opening round of hearings on a bill of Sen. Philip Hart (D-Mich.) that would require the breakup of any company with over 15% of the profits of an industry.

The answer to the problems today, he said, would be met by the first section of the Hart bill as it defines concentrated industries. But he recommended increased funding for the Antitrust Division as the means to enforce the measure instead of a separate agency to deal with concentrated industries.

At the same time he said that "instead of coming out with fairly vague proposals for remedies," the Antitrust Division should announce "quite precisely that they are looking for vertical divestiture into something on the order of eight to 10 companies."

The bill would also call for the breakup

(Continued on Page 2)

Afips Finds No Shortage Of Trained DP Personnel

By E. Drake Lundell Jr.
Of the CW Staff

MONTVALE, N.J. – The myth that there is a lack of trained people to meet the needs of computer users – or that there will be a lack of people in the future – has been laid to rest in a study by the American Federation of Information Processing Societies (Afips) here.

Within a decade, the study indicated, formal college and high school education programs in the computer field "should be able to fill the needs of the computer industry for new entrants even if industry requirements grow at a rate of 10% per year."

The study also noted that "private EDP schools are becoming less important as the public educational system builds up its training programs in the computer area."

This study is one of the first attempts to define the number of people working in the computer industry itself and the number employed by users and to forecast some future training and educational trends.

Around one million people are employed by users, Afips estimated from its survey of users. There are no Census Bureau figures for this employment category.

These one million are employed in four areas, according to the survey, with 210,000 classed as programmers; 150,000 listed as systems analysts; 200,000 in the category of computer operators; and 440,000 employed as keypunch operators.

"In addition," the report said, "installations have administrative and clerical employees. In many organizations there are also employees who are involved with data processing as an integral part of their jobs in other parts of the organization," which indicates that employment related to DP might be substantially higher than one million.

The number of people working in the computer industry itself (hardware, services and supplies) is extremely difficult to pin down, the study noted, since many computer manufacturers have a major part of their business in other fields, and so are not listed in the Census Bureau's computer category.

However, there were 172,300 people listed by the government as being employed by computer firms in the middle of 1972. But the Afips study said the number is probably around 300,000 if all of the computer makers are included.

Even though almost half of all the peo-

(Continued on Page 2)

Banks Biggest Employer

MONTVALE, N.J. – If you're looking for a job in data processing, it is probably best to learn a little about banking – the industry that employs the most computer people.

According to a recent Afips report, 6.4% of all data processing people are in the banking industry, followed by the life insurance business, which has 3.5% of the DP personnel.

Next come the aerospace and defense industries with 2.3% and the utilities with 2.2%, followed by the airlines, electronics and electrical products business, chemicals industry, metals industry and finally the railroads business.

DP Foundation Fortunes Take On Bright Note

Special to Computerworld

CHICAGO – Major changes in the control procedures, a "buzzword generator" to determine a name for the Computer Foundation project and a strong professional desire to strengthen the data processing profession all contributed to a turn in the fortunes of the plan here last week.

The project now looks as though it will achieve not only the operation of the DPMA/CDP examination, when it is relinquished in July, but also a productive working relationship among the various data processing societies.

The project's future, previously bedeviled by arguments on membership qualifications and questions on control, brightened during the meeting of the organizing committee which reviewed the work of the four subcommittees. Examination quality and security, two controversial topics, were discussed fully with

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Expanding Software Sources

Innovation+Determination=Happiness

By Don Leavitt
Of the CW Staff

COLUMBUS, Ohio – Intelligent, imaginative planning by the user and good systems support from the mainframe vendor – even if it isn't the original vendor – can provide the non-IBM user with more software sources than seem possible at first, according to DP manager John Beech of Midland Mutual Insurance Co. (MMI).

MMI is an RCA Spectra 70 (now Univac Series 70) Model 45 installation that has taken advantage of support from both RCA and Univac, from its own in-house DP staff, from outside package vendors and from custom analysis and design shops.

Key to the installation's success – and there is no indication of any interest in moving up from the current 131K 70/45 – appears to rest in Beech's assumption that, one way or another, he and his supporters can cope with whatever has to be done.

Most of the currently operational basic accounting applications have been written in-house, he noted, but the company also utilizes a 360-mode emulator, originally distributed by RCA, which allows the Spectra gear to handle IBM's DOS/360 and "supports any IBM devices" except terminals. Univac has continued support for this emulator package under its Series 70 operations, Beech

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On the Inside This Week

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Innovation Plus Determination Equals Happy User

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stated.

The manager's faith in his staff's ability became evident when he noted that, even if he didn't have the emulator, he wouldn't feel particularly hemmed in by the lack of independent software houses interested in his particular equipment. "If a program is written in Cobol," he claimed, "it's easy to convert."

The use of Cincom System's Total data base management system is now under study, Beech said, as is the choice of either a file management system or report generator. Current candidates, he indicated, are Informatics' Mark IV, Cullinane's Culprit and Application Software's Asi-st.

Commenting on the selection process, Beech said he thought talking to users was useless since vendors "wouldn't release the name of an unhappy user anyway." Well-run demonstrations or trial periods of use can be very helpful in evaluating this type of utility package, he added, but formalized benchmarking of competing systems would be "a waste of time."

On a subject even more fundamental than applications or utilities, Beech said he has been impressed with Univac's updating of the operating system software since it took over from RCA. The support, he said, has been "excellent – far better than under RCA."

MMI has not yet moved up to TDOS 22, the latest release from Univac, but Beech is clearly delighted with the prospects of working with features that just haven't been available to him until now. These include, he said, spool-in/spool-out of low-speed I/O, disk-based compilers and job schedulers for his operations staff.

Outside Help Helpful

The company maintains a "relatively small, highly competent, well-paid" staff of about a dozen systems analysts and programmer analysts. If a proposed project has time constraints that can't be met without hiring more people, however, MMI will go to outside consultants for help.

Currently, for example, Systemation from Cleveland is handling the system design phase of one new project. Whether the programming will be done in-house or farmed out has not yet been decided, but will depend on the existing situation when the decision has to be made.

Backstopping his concern for good systems work even before programming, Beech has started using the Pride control system of documentation and logic guidelines from M. Bryce Associates, Cincinnati. The Pride "package" contains "nothing surprising," he said, but it imposes an objective standard which is the same from application to application.

Pride "may overdo the documentation required" as the user goes from step to step in the design process, but that overhead is justified, Beech felt, since it insures that nothing essential is left out by mistake. MMI has used Pride with several small projects of five or six programs apiece, and is currently developing systems for mortgage loan accounting and agency accounting under Pride control.

In addition to writing and maintaining the conventional accounting applications, the in-house staff has converted a tape-oriented alpha-indexed policyholder inquiry system, acquired from RCA, into an on-line system using disk files and CRT terminals.

Once the local system is fully utilized, it might be possible to extend its capabilities to support inquiries coming over communications lines from remote offices, but Beech is not impressed with this possibility.

"Frankly, I don't think any life insurance company can really justify that type of system economically," he explained, adding, "of course, some of them do it anyway," largely to show how modern they are.

More Funds Urged for 'Outmanned' Justice

(Continued from Page 1)

of companies in any industry where the top four firms controlled more than 50% of the market and would set up an industrial reorganization commission to oversee such "concentrated" industries and a special court to handle cases brought under the act.

On introducing the measure, Hart specifically pinpointed the computer industry as having a large degree of concentration.

Hart also discussed the cost of litigation under the old antitrust laws as a reason for the new measure.

Cost Discrepancy

Speaking before the Senate, he noted that "Control Data Corp. settled its suit – before trial – and was paid $15 million by IBM for costs and expenses of litigation. Yet the annual budget of the Antitrust Division is only $12.5 million."

In his remarks on the Senate floor, Hart also went further in discussion of the IBM/Control Data settlement by noting that the government spent more than $100,000 to develop a document retrieval system.

Then, he said, "the division realized that Control Data was far ahead in its efforts and had developed a more sophisticated system.

"Justice therefore asked for and received access to the company's retrieval system."

However, he noted, CDC had destroyed the index as part of its settlement with IBM and he said it might be too much of a burden for Justice to reconstruct the index.

Thus, he said, some observers feel "the IBM case will never be prosecuted effectively."

At the hearings, Beshar backed this contention by claiming that "the name of the game" in antitrust cases is "delay, delay, delay.

"Hide the delay if you can. Of course, make notices about wanting to go to trial, but if necessary, as we saw recently, get that delay by bringing about the destruction of an evidence index – even at the risk of being in contempt of court."

Hart also noted that concentration in certain industries can cut down on employment opportunities.

In singling out the computer industry, he claimed that when RCA and GE dropped out of the business, job losses swelled.

And, he felt that they might have stayed in the business if IBM had not been so dominant.

This is the first round of hearings on the Hart bill and the committee plans to hold hearings later this year specifically on the structure of the computer industry.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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Second-class postage paid at Boston, Mass., and additional mailing offices. Published weekly (except: a single combined issue for the last week in December and the first week in January) by Computerworld, Inc., 797 Washington St., Newton, Mass. 02160. © 1973 by Computerworld, Inc.

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25 cents a copy; $9 a year in the U.S.; $10 a year in Canada; all other foreign, $25 a year. **MARGARET PHELAN,** *circulation manager.* Four weeks' notice required for change of address. Address all subscription correspondence to circulation manager, Computerworld, 797 Washington St., Newton, Mass. 02160.

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Afips Study Finds No Shortage of Trained DPers

(Continued from Page 1)

ple employed in data processing are women, most of them are keypunch operators and "as one looks at the higher rungs of the occupational ladder, women are an increasingly smaller percentage of the work force," the report related.

"Only 21% of all business programmers and only 10% of all business systems analysts are women," it said. The study also noted only 1% of the keypunch operators is male.

The computer operator position also seems to be a "bastion of males"; the study showed 83% of the workers in this category are male and 17% are female.

In the early days of the computer industry, the report noted, most workers "received their training from the mainframe manufacturers or through on-the-job programs."

This changed during the 1960s as a large number of private EDP schools were established in response to what the study called an "acute" need that developed in the computer community for qualified people.

At their peak, these schools were responsible for training between 50,000 and 100,000 people yearly, Afips said, but this appears to be on the decline as public education assumes an increasingly important role in training future DP specialists.

Such formal public programs "range from high school to graduate school and in 1971 approximately 92,000 trained people were graduated," Afips noted.

Of this total, it said that 33,000 came from high schools; 45,400 from public vocational schools; 7,495 had associate degrees from two-year post high school programs; 3,350 received BA or BS degrees in the computer field; 2,070 graduated from master's work in computer sciences; and 335 received doctorates in the computer field that year.

In comparison, in 1966 about 1,000 degress in all (excluding high school and vocational schools) were granted in computer fields.

In the high school area, Afips noted that probably close to 200,000 students received some computer training, but it noted that of this amount, only 33,000 could be said to have "received sufficient training to enable them to seek work as programmer trainees if they so desired."

Foundation Fortunes Fare Better

(Continued from Page 1)

members of the committee and observers.

Foundation Cochairman John Swearingen of DPMA admitted he was unaware as to the exact constraints involved in the project. He explained that the approval of the DPMA International Board given last year would probably have to be obtained again this year.

Only then would it really be possible to determine what would be acceptable to it, or to ACM. Swearingen said he felt the DPMA board would be decisively influenced by the acceptability of the agreement to ACM.

The importance of keeping the public informed was brought out by ACM's delegate, foundation cochairman, Fred Harris, also the chairman of the bylaws committee. He requested that *Computerworld* publish the constitution and bylaws, preferably in time for the DPMA June convention in Chicago.

Other actions aimed at bringing out the relevant news included the setting up of a speakers' list of organizing committee members, who were prepared to go out to professional societies across the country to explain the plans.

The spirit of negotiation was nowhere more evident at the meeting than in the treatment of the financial matters.

The bylaws committee had suggested tying the voting rights of the various societies to an annual contribution fee. The problems involved were illustrated when Paul Pair of the Association of Educational Data Systems pointed out that the fee would amount to $2 per member for his society, and would be a strong burden, while it would only be about 20 cents per member for the larger societies.

After general agreement had been reached on the financing of the foundation, it was decided to separate any consideration of annual fees, or other methods of obtaining appropriate funds.

Another unresolved issue was that of the name of the foundation. Cochairman Harris reported that the bylaws committee had constructed a three-part "buzzword generator," one part of which had descriptions of the profession (data processing, computers, information sciences, etc.)

Another had names of the people involved (practitioners, members, users, etc.) and a final one had names of the type of organization involved (foundation, institute, association). He confessed, however, that the board was unable to come up with anything free of objections.

The increasing tendency of the societies to send in their top people (there were three presidents attending), so as to avoid votes having to be taken just in accordance with previous instructions, was considered a major advantage, and one of the reasons for the success of the meeting.

The next meeting is scheduled for May 11 and 12. Plans are to finally complete all arrangements leading up to the presentation of the final agreement to the DPMA International Board.

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370 Users . . . Ampex Offers These Problem Solvers

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And, of course, the TM-34 is also available as a stand-alone unit with data rates up to 320 KB.

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360 Users . . . Ampex Offers These Problem Solvers

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Change Concepts

Key-Disk? Discard Safe Approach

By Michael Weinstein
Of the CW Staff

SAN FRANCISCO – A recurring suggestion at Caravan/73 panels on keypunch replacement is that users with key-to-disk equipment keep their input formats to the standard 80 columns.

This advice, to run key-to-disk stations as surrogate keypunches, appears to stem from two areas of user concern.

The first fear is that users will be unable to coordinate central computer operations and outlying data entry operations under key-to-disk.

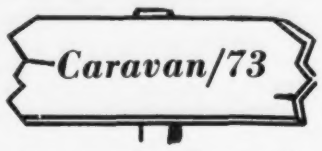
The second fear is based on uncertainty of hardware reliability within the key-to-disk system.

Users who force all input data to fit 80 columns reduce the user advantages and do not take advantage of the key-to-disk system ability to generate recurring standard inputs, attendees agreed.

The crux of the issue is that while users can force their key-to-disk systems to operate as keypunches to fully reap the benefits of shared processor key-to-disk, they must develop more confidence in this approach and be willing to change their concepts of data preparation, thus giving more responsibility to outlying data entry departments.

Under standard keypunch operations the computer department is separated from keypunch operation with computer personnel performing all necessary software development.

This means that editing and validation are traditionally performed in the computer room



using programs written by the computer staff.

With key-to-disk these functions will be performed in what was the keypunch section.

Some Obstacles

Users who have invested considerable time and effort in developing data-handling programs feel that these programs, once developed, should not be discarded.

The other contention – that keypunch personnel do not have proper expertise – is not so clear.

This concern seems to stem from a feeling that to lose control of a vital computer function may lead to a degradation in this operations area.

All people, and computer people in particular, are hesitant about becoming dependent on operations they cannot control, the panel emphasized.

Trepidation Costs

The trade-off to placate these fears is that key-to-disk units are not employed most efficiently, users were told.

First, the ability to catch and correct errors as they occur must be realized.

If the key-to-disk unit is used solely as a keypunch-type unit, these errors will not be detected until they reach the central computer under a production run.

Secondly, users who do not take advantage of the formatting capabilities of the shared processor in the key-to-disk units deny themselves the ability to free the central processor from administrative tasks in data entry.

But probably the most restricting effect of the "safe approach" lies in the reduction of keystroke/hr.

The potential advantage of key-to-disk systems is that they can greatly increase the effective throughput of input data by increasing the number of keystroke/hr performed at each keystation.

This is accomplished not only by the automatic validation and check balancing but by the ability to key the data to suit the form of the source document.

...Beware Mixed Systems

SAN FRANCISCO – As data communications users become more sophisticated, the desire for greater speeds and capabilities naturally leads to a multivendor configuration, Stu Proffitt told the data communications panel.

But the situation is not clearcut, he added, as the cost savings of going to a multivendor environment must be weighed against the cost of developing internal expertise to handle the "invariable" fingerpointing.

Despite vendor claims, Proffitt asserted, no two units are totally plug-to-plug compatible. "Every device needs some added effort such as writing software."

To help in the evaluation of equipment, his firm, Standard Oil of California, has developed a practice that "unless a new device will save 20% or more over existing devices it is probable that in the long run there will be no cost savings."

Also, users with a heavy commitment to data communications applications will not consider commercial networks as a valid option for many years to come.

A question asked at the panel as to whether any users had plans to convert to a network such as Arpa, Tymshare or NCSS in the foreseeable future brought a standard response that these networks would not become factors for maybe 10 to 15 years.

How Important the Data? How Much Speed?

SAN FRANCISCO – "The major criteria to be considered in determining which applications should go on-line is the value of the information to be transmitted and the effect that time has on this value. "This was the consensus of users at the Computer Caravan/73 here.

"The commitment to on-line data entry presupposes that the user of the system is the most appropriate organization to provide the data entry function," G.P. Atkisson related at the data entry panel.

And many applications currently being considered for on-line approaches could best be performed in conventional methods (e.g. through mailing information, using couriers, etc.), "Gib" Hoxie told a tutorial on data communications planning.

But Stu Proffitt stated: "The speed with which the user needs the information and the geographic location where data is collected are the primary points to be considered in determining if an application is best suited for a data communications solution."

While these views might seem contradictory, users here felt they were all "variations on a theme."

Was the information important and did it have to get somewhere fast? This was a common criterion mentioned.

This value did not have to be measured in dollars and cents.

For example, Sherm Walker of the City and County of San Francisco pointed out that it was difficult to put a dollar value on information that dealt directly with people's lives such as hospital or police information.

But in all cases the theme remained constant – was the value of moving information quickly worth the cost to the organization served?

"We are in the paper business, not the computer business," Sid Smith of Crown Zellerbach stated.

In evaluation applications that should go on-line the primary question is whether it will help the production and selling of paper products to a greater extent than it will cost and degrade the computer operations.

In many cases the moving of data on-line must be looked at as an integral part of a work cycle, Steve Tiller added.

In evaluating cost it is necessary to add the cost of other non-computer personnel dependent on the data to perform their jobs, he added.

Smith told of an application with a lumber yard on one side of a river and the paper production facility on the other.

The old method had been to send the bill of lading across the river on a barge with the lumber.

But this procedure had slowed down the unloading of lumber as clerks had to first get the paperwork and organize for the unloading operation.

By sending the same information on-line as soon as the barge was loaded, clerks on the other side had the documents in hand and were on the dock waiting for the barge.

'K.C. Here I Come'

SAN FRANCISCO – The 3,300 attendees at the Caravan here bring the total for the seven cities to 21,000 or approximately 1,000/day.

The Caravan moves on to Kansas City, Mo., April 11-13.

Keypunch Replacement? 'But Let's Take It Easy'

SAN FRANCISCO – Nonpunched card input media may be the message, but it is not the present condition with many users who attended the Computer Caravan/73 panel on data entry here last week.

Most attending users were considering replacing keypunch with on-line entry, OCR, intelligent terminals or key-to-disk. But they were looking for more reassurance before they started evaluating actual operating specifications.

One panel member said the impetus for this increasing concern comes from the more than $1 billion spent on data input in the U.S. per year.

Inevitable Trend

This dollar force means the trend away from keypunch is inevitable and will probably take the form of localized "follow the leader," he implied.

In location after location a large user with more internal expertise will adopt a more advanced method of data entry while other local users watch intently.

The success or failure of these initial users will determine the rapidity with which other users will follow, he observed.

In deciding the exact form of keypunch replacement the primary consideration is the application, users agreed.

For users with a need to translate source documents into computer input from remote locations, intelligent terminals appear to get the greatest support.

For users with all source documents in one location, key-to-disk ranks high.

Users with high-volume fast turnaround requirements should consider OCR.

And for users with applications that work best on an interactive basis, on-line provides the greatest potential, the panel agreed.

But in all cases the impetus to move to another form of media input is a combination of increasing throughput per station and the cost for this improved capability.

For example, in the case of key-to-disk equipment the primary consideration is effective keystroke/hr, one user contended.

This user further advised others not to get so overly involved in technical specifications as to forget the initial objective.

Don't Forget 'Trees'

ANAHEIM, Calif. – A common oversight experienced by users designing a data communications system is letting the terminals dictate the capabilities of the network, according to users at Caravan/73.

While this problem seems elementary and should be the first consideration, many users get so involved with the forest that they forget the trees, users stressed.

One user advised that before starting to move into data communications users should put up a sign saying, "make the terminals fit the communication, do not make the communications fit the terminals."

Avoiding Finger-Pointing

ANAHEIM, Calif. – While it is true users can cut costs considerably with a mixed-vendor communications system, they must consider possible difficulties through finger-pointing.

A controversial suggestion is to give one vendor overall responsibility. This vendor would assist the user in the design and implementation of the communications applications.

It is understood as this vendor helps with design he will use as much of his equipment as he can.

The trade-off is that for the advantage gained by the vendor in being able to specify his equipment, he will take full responsibility for the operations.

If the system or any portion is down, the user has a penalty clause in his contract with that vendor and can withhold payments.

Users at a Caravan/73 session here were somewhat split over this approach. Some argued that by going to one vendor for design and implementation the user was giving up possible monetary gains through a more economical mixing of equipment.

Another complaint was that users should endeavor to understand and control as much of their operation as possible and that the "one vendor is responsible" approach defeated that goal.

First Pay More For More Support

ANAHEIM, Calif. – Users starting a data communications network should start with IBM and AT&T until the system is running smoothly, and then investigate outside vendors.

This was the advice of several experienced users at Caravan/73's data communications panel.

The rationale behind this suggestion, according to these users, is that while users will pay more in the beginning they can expect to receive better support.

Another advantage of the "pay more for more support" approach is that it gives users a learning period. During this period of dependency they can grow accustomed to their system and its workings.

But once the system is running smoothly and users feel confident, the same panel members suggested shopping around for superior cost/performance.

Application to Management

U.S., Russia Agree on Five DP Projects

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. – The application of computers to management will be one of the first areas of cooperative research between the U.S. and the USSR, according to agreements reached here recently.

The U.S.-USSR Joint Commission on Scientific and Technical Cooperation announced approval of five projects in the application of computers to management as part of the 25 action programs accepted in six general areas.

Mutual Benefits

The areas were chosen because they were judged to offer "promise" of balanced and effective programs of further research that would yield benefits for both nations.

The Joint Commission, in its first meeting here, approved all of the projects recommended for action by its Joint Working Group in the application of computers area.

The five projects on which work will start immediately are:

- The theory of systems analysis applied to economics and management.
- Computer applications and software for creating system solutions for large general-purpose problems in the field of management.
- Econometric modeling (development of forecasting models for analysis of various branches of the economy).
- The use of computers for management of large cities.
- Theoretical foundation for the design, development and production of software.

In addition to the projects in the applications area, computer-based topics will also be started in other cooperative projects – most notably in the area of water resources control where a project will cover methods and means of automation and remote control and in the chemical field where a project will start on catalytic reactor modeling.

Signed Last May

The Joint Commission for Cooperative Research was established under the U.S.-USSR Agreement on Cooperation in the Fields of Science and Technology, which was signed by President Nixon on his visit to Moscow last May.

According to officials, under the agreement in the computer area, the forms of cooperation may include:

- Exchange of scientists and specialists between the two countries.
- Exchange of scientific and technical information.
- Joint research, development and testing, and the exchange of research results and experience between scientific research institutions and organizations.
- Organization of joint meetings, conferences and symposia.
- Rendering of help, as appropriate, on both sides in establishing contacts and arrangements between U.S. firms and Soviet enterprises where a mutual interest develops.
- Other forms of scientific and technical cooperation as "may be mutually agreed."

Sheriff Video System Probed

LOS ANGELES – An investigation has been ordered here into the performance of a video-file records system that is part of a $19.5 million sheriff's microwave communications project.

A report is expected in 30 days on the $8.1 million Ampex Corp. system.

The project involves use of a computer to retrieve information stored on videotape.

County officials said the system works but there allegedly is a question of whether the system meets performance specifications in the contract.

An Ampex official said Ampex is working with the county to review the technical aspects of the agreement with the county.

Ampex staff operates the video-file system which was installed in August 1971. No payments have been made to Ampex since December 1971, pending formal acceptance of the system's phase one, the official said.

Grasp Users Grow Up

Special to Computerworld

SYDNEY, Australia – The Australian software package Grasp now has more than 800 users worldwide.

According to the author, Boyd Munro, Grasp has approximately 500 users in the U.S. The balance includes mainly European and UK users. Munro claimed about half of all UK users of DOS were also Grasp users.

The only major computer-using country where the software has not been able to establish a foothold is Japan, where government-directed policies aimed at developing an indigenous software industry have been dominant.

Munro said the continuing development of Grasp included introduction of a teleprocessing segment, aimed at providing a remote job entry facility for users of IBM's DOS.

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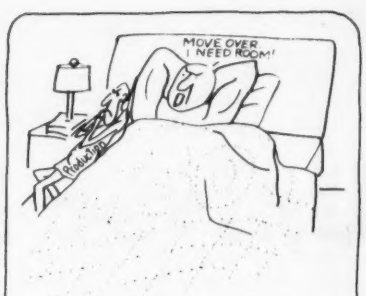

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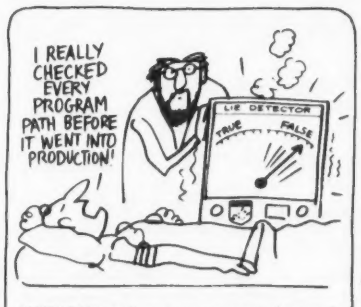
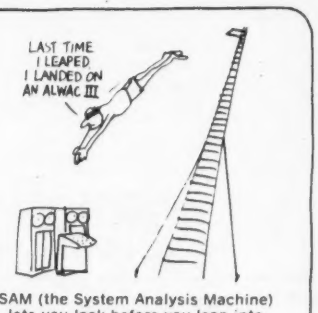


AUTOFLOW reduces memory requirements by detecting unexecutable program logic.



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Users Spared by Floods, Most Are on High Ground

By Bob Wright
Of the CW Staff

As of late last week, data processing installations near or within the flood-stricken areas of Missouri, Mississippi, Louisiana and Tennessee did not expect to be affected by rising waters.

Heavy rains late last year, coupled with recent storms, caused water in flood-control reservoirs to rise far above normal flood-control levels. Extensive damage in low-lying areas was reported but a random sampling by *Computerworld* of user sites showed no installations affected.

Most of those in the threatened area said they did not expect the waters to rise to the levels of their DP installations since they were on high ground.

Robert Bryan, DP manager at Delta Electric Power in Greenwood, Miss., said the flood waters would have to "engulf the entire town" before his building would be threatened. "I don't anticipate any problems. Our installation is built in one of the sturdiest buildings in the area and we are on a foundation about six feet off the ground."

Would Bryan be prepared to implement emergency procedures? "If the waters started coming up," he said, "it would take us less than an hour to get everything up to the second floor or even the roof. We have an engineer who could dismantle the equipment in about an hour. But I really don't expect that it will be necessary."

Users in other cities indicated much the same attitude. Tom Backstrom, DP manager at M.S. Chemical Corp. in Yazoo City, Miss., said: "We have not been affected and have not heard of any other DP installation being damaged."

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Medical Claim System in Trouble

Special to Computerworld

SACRAMENTO, Calif. – An investigation of a prototype, computerized system to process state medical claims for the poor has found a cost overrun of $4.5 million and errors ranging from duplicate payments to missent checks.

The state's auditor general found the overruns and errors after hospitals and other providers of Medi-Cal services complained that their claims were not being paid.

This system has been in operation since August of last year and was funded with $2.5 million. The cost is expected to hit $7 million by June 30.

The system is based on an IBM 370/155 with 80 IBM 2260 CRT terminals in Santa Clara and San Diego counties, the two counties where the system is used to pre-screen recipients of financial aid for medical expenses.

But an official of the auditor general's office said there were programming problems and "controls over input were too tight."

The system was set up and is operated by an administrative group, which is a joint venture of three companies – Pacific Mutual Life Insurance Co., Occidental Life Insurance Co. and California-Western States Life Insurance.

The state report said that more than $180,000 worth of checks have been returned by providers, such as hospitals and doctors, apparently because they were duplicates of earlier payments or were sent to the wrong person.

Blackouts Hit Fla. Users

By Ken Shonk
Of the CW Staff

MIAMI – Power blackouts that struck southeastern Florida on two consecutive mornings last week left local DP operations with lost time and a few lingering headaches.

At the American Bankers Life Assurance DP center in Miami, an IBM 360/30 went down.

"The problem was that one of the peripherals was down at the time of the power failure," DP manager H. Arner said. "We didn't realize that the down unit, a non-IBM unit, was the problem until an IBM field representative pointed it out to us. Then it took us five minutes to bypass the unit.

"The down peripheral appeared to have interfered with the way the CPU sequences up in power.

"The 360/30 eventually came back up."

At the Broward County tax collector's office in the county courthouse in Ft. Lauderdale, a battery backup power supply that had been installed the previous Saturday and had passed simulation tests failed to operate.

Bob Fehr, manager of DP operations, said both the 360/30 and 360/40 cycled down and powered back up properly in spite of the failure, with the exception of the control unit for the teleprocessing system.

"The control unit was acting strange all day," he said. "Everytime the control unit would go down, it would blow the communications system."

An IBM field engineer, he said, told him there is "some kind of heating element" in the unit that must be left on 24 hours a day for it to "maintain its proper operating temperature."

Backup Power

At Eastern Airlines in Miami the no-break power supply with a backup generator operated properly during the blackout. In addition to the blackouts, the facility also experienced a low voltage problem the evening of April 4 and went on reserve power at that time.

Several users lost not only time but also the job running on their machines during the blackouts. Systems Engineering, Inc. in Ft. Lauderdale lost a job on Tuesday on its NCR Century 100 and Carston Rist, DP director, said a job was possibly lost on Wednesday.

Citizens Federal Savings and Loan Association in Hialeah, with a 370/135, also had to restart a couple of jobs as did Western Union Computer Utilities in Ft. Lauderdale. Several other users such as Soundpost, Inc. of Miami Beach were more fortunate in that they were between jobs.

Florida Power and Light had publicly stated Tuesday that it had not isolated the problem. It later indicated an overload had caused the generators to shut down at a nuclear power facility tied into the southeastern Florida grid.

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Ford Reaps 'Enormous Savings' With Supplies Monitor

By Marvin Smalheiser
CW Correspondent

LOS ANGELES – Ford Motor Co., one of the world's largest computer users, is realizing "enormous cost savings" and greatly increasing its production capacity with a computerized information system monitoring its supplies.

The system was described by J. Paul Bergmoser, Ford vice-president for technical affairs, in the keynote address at the recent 1973 Informatics/UCLA Symposium – a three-day meeting focusing on manufacturing management systems.

About 100 persons attended the symposium which featured 17 speakers discussing subjects ranging from management responsibilities to getting a payoff from the system.

Bergmoser said his system has shortened the new car model changeover time and dramatically reduced the time employees in assembly plants usually are laid off during changeovers.

"Although we can't prove it conclusively," he said, "we feel we've gained incremental sales from having new cars more readily available to dealers during the new car introduction season.

"Already, we've saved millions of dollars of direct costs and produced other benefits which are real even though they cannot be quantified."

Optimal Production Schedule

Each night the system calculates Ford's entire parts inventory by part number. It also analyzes the orders on hand to determine which vehicles can be built, and calculates the optimal production schedule for the next day and subsequent day.

"At the beginning of each business day," Bergmoser said, "the computer gives the plant manager a snapshot of his order condition, his inventory condition and his best production schedule with alternatives."

The central computer in Dearborn, Mich., keeps track of all orders to suppliers and shipments made by suppliers to plants.

Bergmoser said the system has also enabled Ford to develop better sales forecasts.

The key to the success of the system, he said, has been planning.

"Without it the computer may end up running your business. With it, the computer may well be the key to new levels of efficiency and profitability – or even the key to survival . . . "

The symposium was cosponsored by Informatics, Inc., Canoga Park, Calif., and the American Production and Inventory Control Society in conjunction with the University of California at Los Angeles.

Hardware 'Available' for $60 Mini

By Ronald A. Frank
Of the CW Staff

NEW YORK – Minicomputer hardware to build a $60 machine is "already available" but the software to program such a machine remains an expensive problem for users. This was one of the main conclusions of a panel session on minis at IEEE Intercon/73 here.

The traditional approach of the mini vendors has been to develop a mini for $600, and then charge $20,000 for a complete hardware/software system thereby "giving the software away for free," one panelist mused.

"Having a higher order language for a minicomputer makes the difference between having a plaything or a valuable computer," according to William Highleyman of Minidata Services.

What Applications

While those attending the session agreed that software for minis is vitally important, an extensive discussion took place on the best applications for the smaller machines.

Ivan Flores, the panel chairman, submitted that minis were best suited for non-recurring programming problems. Attendees argued that minis will probably be most useful in applications where a given problem will recur such as process control.

The panelists disagreed on whether software should be debugged and assembled at the mini or at a larger central machine through simulation techniques.

"About 90% of mini programs are done right on the mini they are designed for," according to Milton Collins of Minico Systems, Inc. Another attendee stressed that the developed software should be brought to the mini after it has been assembled on a larger machine.

"We should not be seeking hardware or software solutions," Henry Oswald of ESP Corp. said, "instead we should find total management solutions to a business problem."

The use of minis in applications requiring large data bases was also debated with Highleyman stating the mini user needs only the data necessary for his particular application. One user said it might be feasible to disburse data base information by giving each mini user the portion of a larger data base that applies to his application.

"Instead of measuring the relative power of the mini, we should concentrate on making the machine fit the user's needs," one attendee said. Collins said one of the problems with allowing engineers to program minis is that they become more enthralled with the computing capability of the machine than with trying to solve the problem at hand.

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'I'd Rather Fight'

MADISON COUNTY, Ill. – Three county officers here have refused to allow their department paychecks to be prepared on the county's $300,000 computer system.

"We are elected officers and have the right to control our own departments," said George Musso, county treasurer. Musso cited an attorney general's opinion which supported the actions of Musso's office plus the offices of the county clerk and the recorder of deeds.

Musso said it only takes "a very short time" to prepare the payroll for his 34 employees and although actual processing time on the computer would be faster, "by the time we got the records to data processing and got the paychecks back, we could do it manually," he said.

The county currently handles payroll for about 540 employees. Seventy employees are involved in the three reluctant offices.

Checkless Society Due for 'Big' Steps

By a CW Staff Writer

HAWTHORNE, Calif. – "Significant steps" toward the checkless, cashless society will occur in the next year and the concept will spread rapidly during the next decade, according to TRW Data Systems, one of the suppliers that hopes to take advantage of this growing computer-related market.

There will be major changes in all aspects of credit buying and financing during the next decade, according to Leonard Mackenzie, vice-president of marketing, and many of them will be tied to computer-based systems for billing customers and for issuing payments on those bills.

Extend Communications

First, he said, major banks will extend their on-line channels of communications to retailers and other merchants on one end and also to national Federal Reserve Bank computer centers and credit card communications channels on the other side.

Expanding communication capabilities will also bring faster customer service with greater transaction control within banks and will alter the characteristics of branch banking through the use of on-line functional cash dispensers, he predicted.

Although the hardware and technology exist at the present time to implement some of these systems, he said, they would not be implemented until they could be made more cost-effective for the user.

And the way they will be made more cost-effective, he indicated, will be by linking all of these various services (point-of-sale, automatic banking, automatic deposits and clearances of checks) into a total system. Each part alone might not be cost-effective, he indicated, but connected in a total system, the entire package would be.

He noted that a major study has predicted that one day clearance of checks through the Federal Reserve's computers should be in operation by 1974 and that multibank point-of-sale systems should be operating by 1975.

In addition, the study predicted automatic account debiting will become common in 1977 and check flow will be reduced to less than half the 1972 level by 1979. A 70% reduction in the use of cash and checks should also come in the 1981 to 1982 time period when compared with the use today.

IRS Keeps Humans Out of Audit Step

LOS ANGELES – Taxpayers may soon hear directly from a computer at the Internal Revenue Service if their taxes need an audit.

And they'll probably reply directly to the computer too, according to Tax Corporation of America, a tax preparation company.

The IRS's no-humans-involved program was reported in a memorandum to Tax Corporation's 5,000 tax-preparing counselors around the U.S. The program is separate from audits conducted at local IRS district offices, TCA said.

'Audits by Mail'

Source of the new "audits by mail" are computers in IRS regional service centers. The computers are programmed to watch for various discrepancies which IRS consideres worthy of audit.

If the taxpayer supplies a satisfactory answer, the computer is instructed to accept his answer and the quick audit is over. Otherwise, he will get a bill from IRS, according to the tax preparation company.

The entire audit sequence is much faster with the computer than the traditional audits through local offices, TCA said. For one thing, they occur sooner – the computer is checking returns even before refund checks are issued.

And, if 10 days pass without a reply from the taxpayer, the computer automatically issues a report showing complete disallowance of the item that was challenged.

The tax-preparing company emphasized that the second report from the computer – the disallowance of the challenged item – is definitely open for discussion.

Got Tax Questions? IDRS Has Answers

BOSTON – With the ominous date of April 16 approaching fast, millions of Americans are generating the basic input information for a new IRS system as they fill out their income tax returns.

The Integrated Data Retrieval System (IDRS), the newest taxpayer service tool geared to answering the flood of taxpayer questions, is an on-line real-time system which can retrieve stored information in an average of four to 10 seconds.

Ten service centers around the country assure nationwide coverage. Terminals in regional and district offices are used to access information from the centers.

So far, the IDRS system is still in the first of three implementation stages, and not every taxpayer's return is on file. The current IRS computer system selects returns with "high query potential," such as those with mathematical errors or balances due, and these are put in the IDRS file for rapid accessibility.

The next two phases will increase the effectiveness of the system's collection activity. The complete system will be used to access account information and input adjustments.

The IDRS system functions much like those systems used by airline reservations clerks. Using a special code, changed daily to maintain security, the IDRS operator punches in the taxpayer's name, Social Security Number and question on the machine's keyboard. Within seconds a reply appears on the operator's CRT terminal.

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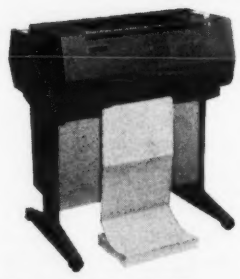
This basic 101 system, including processor, card or paper tape reader, line printer, and one dual platter disc unit covers no more space than 2½ feet by 10 feet! It can be placed in rooms where larger computers just won't fit. And, because it generates little heat, air conditioning requirements are minimal.
Big advantages in small pakages include freestanding add-on dual platter disc units, each having a storage capacity of 10 million bytes. A line printer that turns out 300 lines of crisp printing per minute. And an optional 30-character per second I/O Writer.
The 101 processor, heart of the system, includes features like a high-speed memory that can expand in practical increments from 16K to 64K. An optional multiplexor that provides control for 10 communications lines, with no increase in cabinetry. Seven-way to nine-way simultaneity. And many other features just as significant.
Later, as your business grows, you can expand this modular system to meet increased information requirements.
Larger capacity disc units and higher speed printers can be added if and when you need them.
For the price, this new system from NCR offers big performance for businesses on the grow. Average systems range from just $1820 to $3800 per month!
Call your local NCR office for the specific advantages your business can expect from this newest member of the NCR Century family.



lightweight, pedestal type LINE PRINTER turns out 300 lines of crisp printing per minute.

the 101 PROCESSOR features high speed expandable memory, optimum hardware/software efficiency, dramatic throughput capabilities. CONTROL CONSOLE facilitates communication between operator and processor. Hard working CARD or TAPE READER (COT) assures fast, reliable coded input.

DISC FILE storage provides ten million bytes of ready information in each single spindle dual platter disc unit.

NCR
Computers & Terminals

Editorial

The Need for Computer Auditing

(see letter)

There are many items and products which can have their quality controlled by careful adherence to a set of standard checks and procedures. Drinking cups, headed notepaper, etc. are among these. Accounting systems, however, are not, and have never been so.

As the then president of the American Institute of Certified Public Accountants, Marshall Armstrong, said in 1971, "No accountant in the history of our profession has been able to establish foolproof controls against fraud . . ."

If the accountants have been unable to do it in over 100 years, it is somewhat presumptuous of data processors to claim to have succeeded in a fraction of that time – whether the claim is made directly or implied.

Yet, this is the implied claim being made by Diamond International Corp.'s Peter Rijken when he denies that the total reliance upon his company's system, including testing procedures, may constitute a loophole in election auditing.

Auditing, understood properly, is the accounting profession's answer to the problem of establishing foolproof controls. It consists of requiring that the accounting procedures be subjected to after-the-fact, technically trained independent tests.

Unlike predesigned controls, audit tests cannot be totally known in advance, and so cannot be totally taken into account by a person who wants to change the election results.

Unlike non-technical tests, audits are not satisfied by a few sets of correct results being produced for lay journalists, or political figures. Nor are audits satisfied even by a history of previous correctness. The fact that no fraud or mistake occurred this year is no assurance that one cannot take place next year.

Data processing systems need auditing, for it is their best-known protection in view of the reality of the impossibility of foolproof controls. Data processing system vendors like Rijken should welcome those who are prepared to assist in auditing, and even in financing the audit.

They should not deny the need – at least not until they have a great deal more evidence on how to establish foolproof controls against fraud.

And that will not be for quite some time yet.

Attitude Vital in Communication

"I know you believe you understood what you think I said, but I am not sure you realize what you heard is not what I meant."

Management
By Frank Greenwood, PhD

Communicating with others is not easy. It is not true that if you can talk, you can communicate (i.e., have a meaningful exchange).

Obstacles to communication include:

- Language – After a meeting kicking off the system design phase for the new personnel system, it is flabbergasting to learn from a bright young interviewer that she understood little of it (e.g., input, output, random access).
- Preconceptions – The image of instant, effortless automation is incorrect, but it persists in enough minds to be a daily headache.
- Anxieties – Fears that new computerized systems cannot be understood or will replace people are common.
- Defensiveness – Anxieties induce defenses such as blaming the computer center people for inaccurate input.
- Objectives – Conflicting objectives, such as making the computer center the scapegoat for poor management in the input office (versus trying to improve the information system), sometimes exist.

Flow of Meaning

Communication occurs when there is a flow of meaning between people *despite* these obstacles. Such barriers are part of communication. They cannot be wiped away; they are a component of communication. That is, resistance to understanding has to be dealt with as a normal part of the act of communicating.

Your attitudes largely determine your success in communicating. Barriers probably cannot be overcome if you tolerate only agreement and consider your view as final, or if you simply instruct an individual in a superficial, technical sense and do not take him seriously as a person.

In contrast, communication is encouraged by openness to the other, by seeking to know him, and by taking him seriously as an individual. (See Reuel Howe's paperback, *The Miracle of Dialogue*, in its eighteenth printing).

Your attitudes are influenced by your purpose, so consider the purposes of communication. It is not a purpose of communication to make decisions for your associates. (A good guide for decision-making is that you do *not* make decisions others should make, or that are premature, or that are not now relevant, or that cannot be implemented.)

Further, it is not a purpose of communication to achieve agreement with your view.

The correct purposes of communication, therefore, include supplying essential information and helping people make their own decisions.

Communicating – entering into relation with other people – is difficult. You must be willing to reveal yourself (fighting the natural tendency to overprotect yourself) and to hear and to receive the meaning of what the other person says and does.

Communicating thus involves both the content of the dialog and the accompanying human relationships. A demanding business, it requires that you speak when necessary, despite the risk, and that you be appropriately silent, avoiding the attractive role of natural-born-leader (who does all the talking and makes all the decisions).

Communication cannot occur unless you first accept your human relationship with the other. But the other person may not accept you, or may ignore you, or may otherwise discourage you. Accordingly, determination – courage, even – is needed.

It is also true in communicating that we are influenced by the attitudes we bring to the meeting. Our predisposition may prevent our listening to the other person, because we hear only what we expect him to say.

Listen and Learn

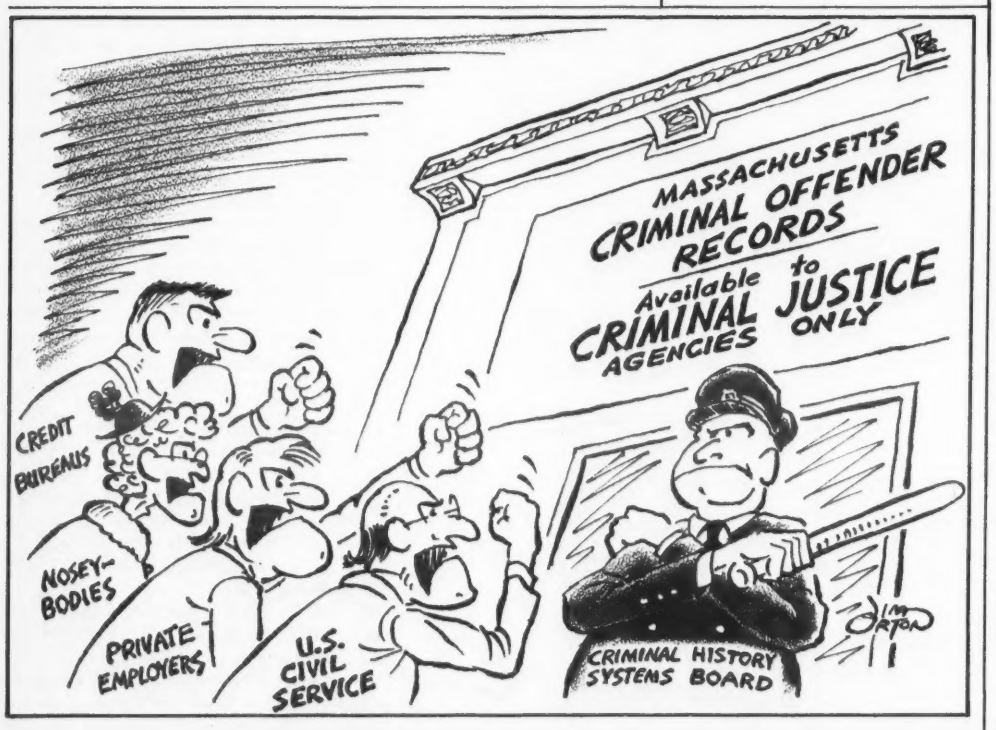
"Garbage in, garbage out" applies in communicating. If you do not listen, sort out the important facts and ideas and remember them, you are wasting your time. Listening is, therefore, at least half of communicating.

Attention is basic. You have to concentrate on what is being said. Mind-wandering can be controlled by deliberately seeking interesting points in what is said and by fighting distractions.

People often solve their own problems if you will just listen.

Management is the art of getting things done through others, so there is little argument that communicating with other people is a basic management skill.

(Frank Greenwood is director of the computer center at the University of Montana.)



'We Demand Our Snoopers' Rights'

Letters to the Editor

Test Procedure Avoids Auditing Loopholes

In the March 7 issue, *Computerworld* published the results of an interview with Gerald L. Mann Jr., director of the City of Honolulu's Department of Information Systems.

In those results as printed several statements have been made with which I disagree. I was present at the computer site both during the primary and the general election as a representative of Diamond International Corp., the vendor of the programming system, called Datavote.

Therefore, I feel I am in a position to review some of the apparent misunderstandings. The following are the statements and my comments on each:

- Who checks the election results here? "The same program that produced them in the first place."

This is not true, as the program output is checked using a logic and accuracy test, before, during and after the election, and the results of that test are carefully checked each time. In addition, the group of independent observers, who represent the political parties involved, the League of Women Voters, the Bar Association and the press, each submit their individual test of which they know the results before submitting it.

- A loophole in auditing? Yes.

I contest this statement, as there is an elaborate testing procedure performed plus the political observers did submit their own sample ballots for a test, and verified the results.

- Currently, election results are processed by an outside computer service. If this statement refers to the ballot count for the City and County of Honolulu, it is not factual.

The program that counts the ballot cards is purchased from us; however, the State of Hawaii owns all the programs in source form and must perform some modification to customize the system for any given election. The processing is accomplished at a computer installation operated by the State of Hawaii, using some employees from the state and some from the City of Honolulu, some even from Mann's own department!

There are some people employed on election day who have been selected from Honolulu business operations, but all these different people are selected by the election officer because of their experience in prior elections or because of their skill, useful at the election.

For the other counties in the state the count is performed with a variety of methods.

- The only audit made on the outside program is to rerun data from selected precincts using the same program and computer.

This statement is erroneous; for example, the count for the County of Hawaii is performed at a different computer and audited in Honolulu.

Peter Rijken
Diamond International Corp.
Los Angeles, Calif.

(other letters and viewpoints on Pages 11-14)

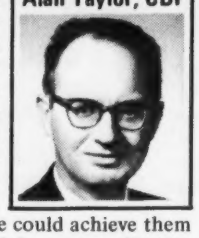
Labels Tell All — IBM's a 'Lender'

Justice Department Should Take Cue From Supermarket

There have been many suggestions as to how the Justice Department should treat IBM. However, as far as I know, no one has ever suggested that Justice take its cue from what can be seen in a supermarket.

I walked around a supermarket recently and noticed that some foods are being labeled quite differently than they used to be labeled.

The Taylor Report
By
Alan Taylor, CDP



And seriously, I think it's quite possible that by labeling IBM and its products in an appropriate manner we might be able to achieve most of the ends that Justice and the profession are looking for. More to the point we could achieve them in a way that could be more effective than the 1956 Consent Decree has been for the past few years.

In food shopping today one can, for instance, buy mixtures of beef and gravy. In just the same way, in computer shopping you can buy mixtures of machines, service, software and maintenance.

The problem the housewife faced was not knowing just what was in each mixture. The solution was to force the companies to reveal these facts on the label. The most important ingredient had to be listed first. Now the rules say that the type-size and other items shall reflect the real contents. So now packages of "gravy (mixed with beef)" can be seen alongside packages of "beef and gravy." Now housewives can easily tell the difference between them.

Moreover, as far as the essential ingredients are concerned, the label must also say the item includes (in mixtures like gravy) such things as water, cooked beef, beef fat, flour, starch, salt, hydrolized plant protein, onion powder, caramel color, sugar and flavoring.

These labels seem to be quite useful to housewives wondering what the difference is between two or more offerings which, judging by the pictures, are apparently the same. They also make it a little bit more plain just what one is purchasing for his 42 cents.

Computer Users Also

It isn't only the housewife who wonders just what her money is purchasing and how much value she's getting for it. Computer people also have this problem.

Moreover, it isn't only the housewife who has a crisis. She has a crisis with the cost of living, whereas data processors have a crisis with the comparative lack of any serious interest in the quality of their product.

Almost without exception, DP experts have not concerned themselves with quality, only with such points as how to get a tape to read under some new operating system, or other secondary factors.

This lack of interest in the quality of products has come about because the cost figures – like the gravy contents – have not been seen. They, like the amount of gravy that can be in a stew, have been obscured under a picture which does not reflect the full reality.

So I've been spending some time designing a frozen food-type dinner for a typical IBM computer rental. Of course, the first thing was to find out what was the essential item IBM was selling; was it in fact beef or was it gravy? I found the answer in a Sept. 18, 1968 memo from Tom Watson Jr. and some explanations he gave later. He said IBM was really a rental operation, and was being forced by the leasing companies to sell some of its products. Apparently IBM found that when it did sell to leasing companies, it affected profits on the rental side. So IBM limited such sales to levels that did not endanger its rental income. It looks as though IBM can be regarded primarily as a rental operator, so let's put the "rental" in the main area in the dinner.

But IBM is certainly other things. It is, for instance, a computer manufacturer. It's really a tight sort of manufacturing. The ordinary person can't order a particular product unless IBM has it in what it calls "new production." Otherwise it will insist on selling – at new prices – a used system. Manufacturing is still an important point so we could put it in as a side dish.

There used to be, and perhaps there will be again, a third area – the service bureau area. This has just been closed off, at least until 1978. But it's still there, so perhaps we should keep a space for it.

Then comes the little area – the sales area. IBM policy, I find, is to have this controlled to 10% and to turn it on or off as it wants. So we should only give that the sort of space that a breadroll gets on a frozen dinner. It's only there at all because the U.S. Government prosecuted it for breaking the antitrust laws, so it does not deserve much more space.

Now we can see what IBM is really offering. There's only one problem – we still can't tell what's in that main offering, the rental system.

IBM Rental "Contents"

Rental rates are developed by IBM through the use of a complicated formula which takes in all sorts of costs and then adds a 30% profit. This is worked out over an arbitrarily allocated life length. Then the rentals are adjusted to take this amount into account.

After this calculated life is over the rental stays the same because IBM believes – it says – that the value of the machine in producing pay slips or whatever it is used for, remains just as great later as it did originally.

As a result, if the rental stays the same, although there are no costs being recovered, rental profits start accruing rather fast.

According to evidence given by IBM's director of finance these profits accrue at the rate of 2% of the total purchase cost per month once the costs are recovered. That's 24% per year, which is good money.

One of the points that obscures this matter is that IBM tends to use an unrealistically low number of years for the derivation of the rental figure. Computers, as IBM itself points out, keep on running. A computer shopper will probably be interested in knowing how his rental money is being spent compared with a purchased system.

System Life

This, of course, depends upon how long the system life is going to be. We don't really know how long the lives of computers are going to be, particularly not when they've been introduced. But we can get some estimates, for instance, with regard to the life of the 360 systems.

IBM Model 30s were first delivered in 1965, went out of new production in 1969, and so were produced over a four-year period. They are still strongly in use so that currently the average life is probably over seven years.

This means that IBM has been paid almost twice over for the machine – and still the user has no equity in it!

Now what this means with regard to real IBM profits I can't say. After all, tomorrow the machine may be scrapped. Alternatively it may be kept in use for years.

If it stops being used as a Model 30, it can reappear as a Model 22, or in one of a number of guises. Profit figures then, don't seem to be too informative, except if one looks at the IBM annual reports and sees that they are certainly being made. Profits must come from somewhere.

User Situation Clearer

From the point of view of the original computer user who is interested in getting his job done, what he is interested in is whether he should rent or whether he should purchase.

For this he needs to know what the costs of rental are, what the costs of purchase are and what the secondhand value is. Then a nice little graph could be made which gives some examples of the life of systems.

Now if you, as a computer user, had a chart like this next time you were thinking of obtaining more computer power, I think you might react very much the way that housewives react when they're shown in large print that it's gravy they're buying rather than meat.

They don't stop buying the gravy – they merely take the alternatives properly into account. They don't assume using the picture in front of them that it's really meat they're buying. In fact, they become informed buyers.

I believe that informed computer buyers would economize enough on hardware that they could stay involved in the quality of data processing, rather than in the intricacies of the latest glamor way of getting the paychecks out, which they can do perfectly well with older equipment.

And so here is my suggestion to the Justice Department. Go around a supermarket, and then instruct IBM to label itself accurately, to stop calling itself a computer manufacturer because it is not essentially a computer manufacturer, but instead to call itself openly and in large letters a "computer lender."

At the same time Justice could be sure that the way IBM lends computers and its costing methods are published – just as the contents of gravy are published. After all what's sauce for the goose is sauce for the gander, and I can't see too much difference between the gravy around the meat and the "gravy" that comes as a result of lending at such unusually high interest rates.

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Letters to the Editor

End User, OEM Salesman Not in the Same League

In the viewpoint entitled "Why Don't Salesmen Talk of the Application?" [CW, March 14], Jerrold Asher makes some good points regarding the lack of systems and applications knowledge on the part of many DP hardware salesmen.

But I feel he confuses two fields of sales endeavor in our industry: end-user systems sales, and OEM or "purchase for resales" selling.

In the former, application of the product and user benefits are of prime importance. But in OEM sales, the salesman is speaking to an engineer (or should be). The "contest" or "game" Asher refers to is indeed one of numbers, specifications and price. If the OEM buyer cannot, on his own, analyze product offerings in light of his planned applications, then he and his company (and their potential customers) are in trouble.

As to Asher's question, "Shouldn't these well-paid men be capable of applying the unique features of their equipment to specific problems? Isn't that what salesmanship is?" Yes, he should and must have this ability when dealing with the end-user. But an OEM purchaser must be able to select the proper component parts for his company's systems offerings.

For this, he expects and receives large discounts from the manufacturer based on quantity purchased. As to the statement "well-paid," good salesmen are (and deserve to be) well-paid; poor salesmen deservedly are not.

Paul B. Landry
Director of Marketing
Data Systems Division
Gould Inc.
Newton, Mass.

Analyst Job Opportunities 'Grossly Overestimated'

The old game of lying with statistics seems to be par for the course with government bureaucracy. This is true with the projections of "Occupational Manpower & Training Needs" issued by the U.S. Bureau of Labor regarding projections for systems analysts.

This report is grossly distorted and falsely misleading. So optimistic are these figures for the 1970s that a 193% growth rate is projected, requiring average annual openings of some 27,000 – 4,000 replacements and 23,000 new openings.

If one looks realistically at the job market for systems analysts from 1970 to date (and running some sample tests for evaluation), there are hardly 63,000 jobs opening up in this field. Were there that many, the demand for systems analysts would have absorbed the thousands still out on the street trying to find reemployment and would have created a shortage which would be acutely felt.

The advertising indexes for jobs and conditions of the current job market all over the country do not indicate any kind of demand which approaches these optimistic figures.

Such misleading propaganda misdirects efforts of students in school who are counseled by college counselors. It also creates an artificial and unnecessary glut of systems analysts in the market for which there is no equivalent demand.

John J. Callahan Jr.
Saratoga Springs, N.Y.

RPG Produces Profits

Marvin S. Ruth's statement, "I prefer state of the art companies" [Letters to the Editor, CW, March 28], sums up the major problem obsessing our entire profession; programmers and analysts who work for companies forget they are supposed to produce a profit. They are entranced with the equipment and languages and never care a whit whether their way is the profitable way.

Several years ago *Computerworld* published the results of a Navy study that showed a certain volume of programming work took an RPG programmer one hour, a Cobol programmer two hours and a BAL programmer nine hours. Why not perform yet another public service and republish that chart with a special heading reading; "Attention Company Treasurers."

John R. Thomas Jr.
H.H. Cutler Co.

Computerworld presents its new sister:

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SHUKAN COMPUTER
THE FIRST COMPUTER NEWSWEEKLY FOR... JAPAN

"Shukan Computer" means "Computer Weekly" in English. In Japan, it means a whole new way to communicate with the world's most rapidly growing computer market.

As a joint venture of Computerworld, Inc., and Dempa Publications, Inc., *Shukan Computer* will provide the only newsweekly for the Japanese computer community. Like its sister, *Computerworld, Shukan Computer* will cover the latest developments in all aspects of the computer industry; including hardware, software, services, application techniques and industry trends.

Hideo Hirayama, President of Dempa Computerworld Company and Patrick McGovern, President of Computerworld, Inc. look at the first copy of Shukan Computer.

Dempa Publications is the leading Japanese electronics publisher.

Dempa publications is currently the leading Japanese publisher of information services on electronics, including *Dempa Shinnbun*, the 200,000 circulation daily newspaper of electronics. Dempa maintains twenty-five editorial offices throughout Japan, the U.S. and Europe, which, along with *Computerworld's* editorial staff and correspondents, will provide the largest newsgathering organization of its kind in the world.

The Staff of Dempa Computerworld Inc.

Dempa Computerworld Inc. will do more than publish.

The new company set up to publish *Shukan Computer* is called Dempa Computerworld, Inc., and it will become involved in a variety of communications activities. It will conduct surveys on the Japanese computer market, hold seminars on new computer equipment and techniques, and, in early 1974, plans to run a "Computer Caravan" Forum and Exposition. Similar to the U.S. Caravan, the Japanese Caravan is tentatively scheduled for five of Japan's largest cities. Right now, *Computerworld's* U.S. and European Caravans are scheduled for 28 cities in 1973, and a total attendance of more than 85,000 professional visitors is expected.

Japanese computer market large and growing.

Right now, Japan is the largest single-country computer market outside the U.S. As pointed out by *Computerworld's* President, Patrick J. McGovern, "There are now over 15,000 computers installed in Japan, and the number is growing at over 25% per year. This growth and the current liberalizations of Japanese import policy on computer equipment makes Japan an especially attractive market for computer product and service marketers headquartered in the U.S. and Europe."

The Japan Ministry of International Trade and Industry indicates that by the end of 1975 there will be 38,000 computers worth over $12 billion in Japan. There will also be very rapid growth in the use of peripherals and terminals, and services and contract software, providing almost unlimited business opportunities.

Shukan Computer's Circulation starts at 35,000

Initial circulation of *Shukan Computer* is guaranteed at 35,000, which provides in-depth coverage of computer users and industry personnel. Based on IDC data file lists and the resource lists of Dempa, circulation is divided about 80% to end-users and 20% to the computer industry. Circulation development methods will be the same as those which gave *Computerworld* the highest paid circulation in its field in less than four years.

Advertising in Shukan Computer is easier than it looks.

Advertising sales for *Shukan Computer* will be handled in the United States by Computerworld Representatives. Rates are reasonable, based on a CPM of $35 (at current conversion levels—All rates are in Yen, and are estimated in dollars for convenience only). Full-page units are 9½" x 14½". Smaller units are available.

Also, *Shukan Computer* will provide translation services and aid in the establishment of marketing channels for companies new to the Japanese market.

Don't you always celebrate a birth with a cigar?

Shukan Computer hopes for best of both.

As Pat McGovern puts it, "*Shukan Computer* will combine some of the best features of *Computerworld* with some of the proven successful techniques of Dempa Publications, to produce a publication that is unique in Japanese trade publishing. We expect it to be a great success!"

COMPUTERWORLD

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Vice President
Computerworld
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Interested in Cobol Development? Make Suggestions Direct to PLC

By Fred L. Forman
Special to Computerworld

Viewpoint

I have recently been an observer at two Programming Languages Committee meetings, and I am very interested in the development of Cobol. I was startled by Alan Taylor's article in the March 14 issue.

His report presents a ridiculous approach to what he views as the problems of Cobol development. He complains of the delay in getting users' changes to Cobol, yet his solution is to put *another review* committee between the users and the PLC.

How this would facilitate development is not obvious to me. Also, $20 for a copy of a statement by the chairman of PLC about mimeographing costs (and other equally important notes) seems expensive and not very relevant to the development of Cobol.

How PLC Works

Taylor knows full well how PLC functions. PLC accepts proposals from anybody on the subject of Cobol development (e.g., Taylor currently has a proposal outstanding). Although PLC does have rather stringent proposal format rules, the Proposal Editing Task Group meets prior to most PLC meetings and will correct any minor problems.

If the proposal is in the format of suggestions, then the suggestion is considered by PLC as a working paper. If the idea is judged to have merit, then PLC will usually direct one of its members to convert it to a proposal.

Furthermore, the workings of the PLC are not secret, and a sleuth somewhat less qualified than Sherlock Holmes could easily discover what is going on.

For example, the PLC publishes *all* changes to the language in the *Cobol Journal of Development*, which is available to the public. The current Data Base Language Task Group proposal is also available to the public.

Who Are They?

Who is PLC? It is composed of designated members from IBM, Univac, CDC, DEC, Honeywell, National Bureau of Standards, Computer Sciences Corp., Southern Railway and others. These members are qualified to consider the full implications of changes to the language and desire to maintain useful and compatible features in Cobol.

My question is: "Who is the Cobol Coordinating Committee?"

To respond to a few of Taylor's specific points:

- Hardware independence is a myth, and Taylor knows it. Certainly Cobol has eased any problems of transferring from one machine to another.
- As for the problems of getting a proposal accepted by PLC, all proposals are accepted (as mentioned above). Getting it passed is a matter which depends on the merits of the proposal.

Furthermore, most proposals are considered within three meetings of the time of receipt.

90% Passed

In the last year, 45% of the proposals considered were of non-PLC origin. Of those on which a decision was made over 90% were passed. The others are currently active pending further work.

- The implication that PLC is secretive is senseless. Taylor has been regularly receiving the minutes of PLC meetings, for example. Also, PLC is now inviting people submitting proposals to the meeting at which their proposal will be considered.
- The subscriber to the *Question and Answer Journal* should be aware that he is not getting an official opinion on the merits of various suggestions about Cobol, but most likely the opinion of Alan Taylor.

Taylor concludes: "If you are interested in the development of Cobol . . . please consider subscribing to one or more of the journals . . . "

I think that if you are interested in the development of Cobol, you should save your $80. Invest $3.50 for the new *Cobol Journal of Development* (1973), read it and make suggestions or proposals directly to PLC. I believe this is the most effective way to affect Cobol development.

Forman is a senior project manager at American Management Systems, Inc. in Arlington, Va.

Letters to the Editor

Meet the Editors

We were pleased to see a review of *Cobol Support Packages*, which appeared in the March 21 issue under "Book Marks."

The article implied that Richard G. Canning edited the original Cobol series which appeared in *Data Processing Digest*. In fact, Richard G. Canning and Daniel Couger are editors of the *Wiley Business DP Library*.

The Cobol series which appeared in *Data Processing Digest* was edited by Stanley M. Naftaly and Michael C. Cohen and written by Bruce G. Johnson.

Margaret Milligan
Publisher
Data Processing Digest, Inc.
Los Angeles, Calif.

Join a Society and Work

Re: Which Society Should DPer Join? [CW, The Professional Viewpoint, March 21]:

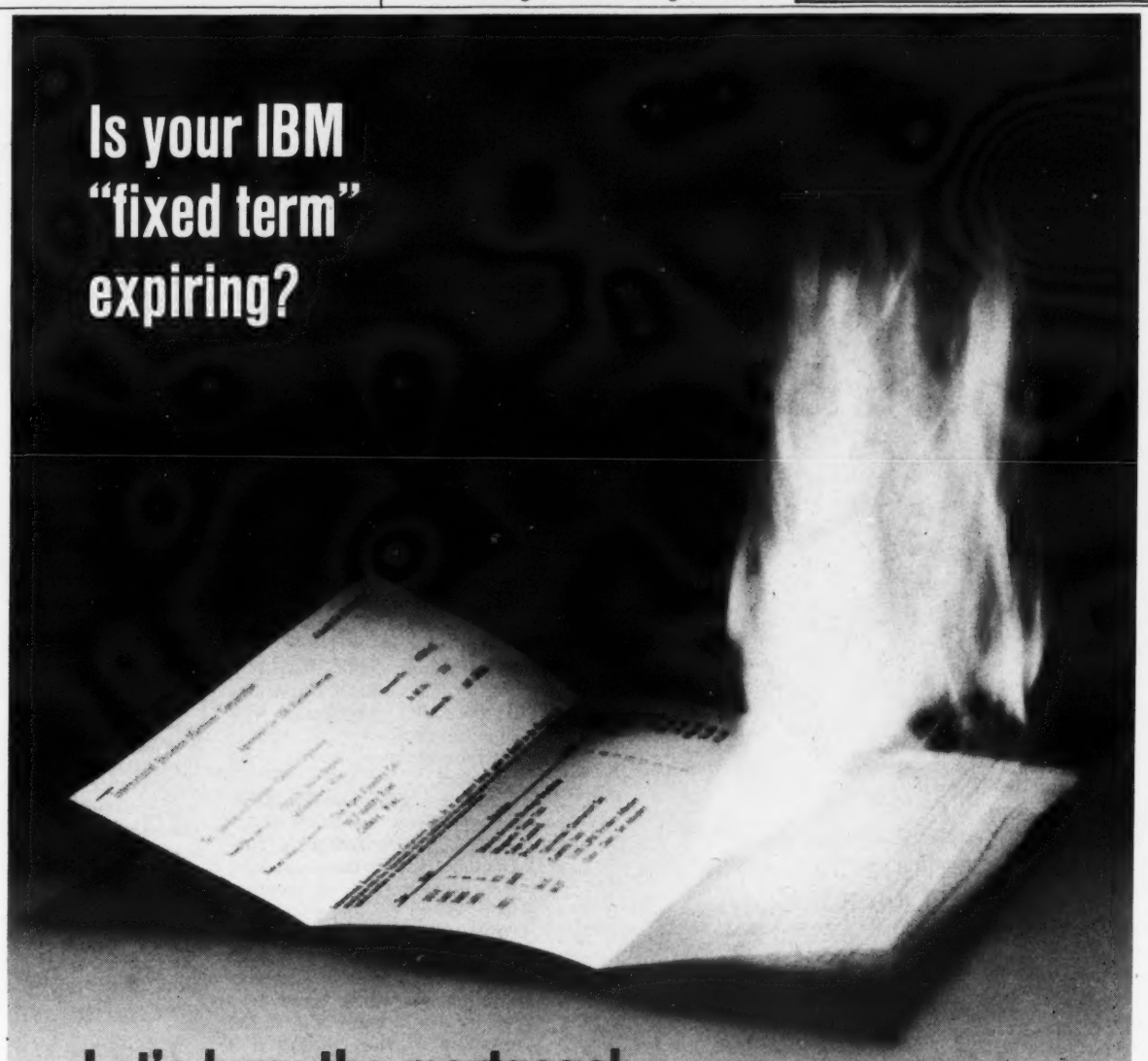
Cris Coddington has the right idea. I may disagree with some of his observations, however, his general thought has reached the heart of the problem. Not one of our societies speaks for its general membership. Not one really offers what it reports to offer. I hope the various societies take notice of his viewpoint.

I too would like to see DPMA work with SCDP and SPDP to come up with a truly representative society. I think the SPDP is trying to do just that. That is why I have paid my dues and joined.

I still work through DPMA to accomplish this same objective. I encourage all professionals to join one of the societies, then work toward a goal of realistic representation.

Cornelius M. Head
Indianapolis, Ind.

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.



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What's the difference? Plenty. We give you . . .

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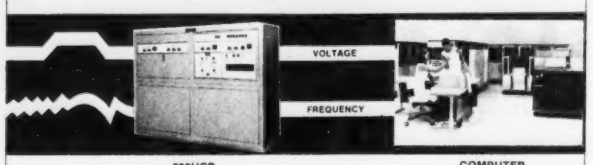

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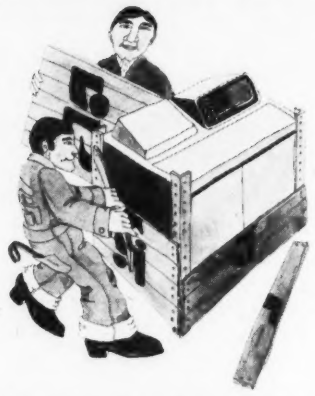

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Letters to the Editor

Evaluate Systems As Separate Entities

In reference to the article on "Programming Methods Waste Time, Talent," [CW, Special Report, Feb. 28], I fully agree with Sider's comment on the team concept, except that a programming secretary is not necessary. A programming secretary is really doing the job that a junior programmer should be exposed to in his initial training period.

I do not believe that programming secretaries should do special things for programmers. If proper documentation is written concerning a program, the only person who can do that documentation justice is the actual person who wrote the program.

If a programming secretary has to write the information down based on what her analysis of the program is, this is redundant.

In his comment on the designs of systems, Sider stated that "most systems designs are little more than carryovers from tab days." This has to be looked at from an economic basis.

For example, if a particular tab operation was converted at minimal cost and it operates much faster, with accurate output, who can say that a new, complete third- or fourth-generation on-line or real-time system is necessary?

The processing methods using computers depend on availability and cost of equipment, as related to speed and accuracy of needed, useful reports, both internal and external.

The determination of need is done in the feasibility (initial) study, then the system is designed using all available tools that the installations have. This also includes the user, as well as the hardware/software/technical experts, being involved in a systems design. Maybe the "tab" system wasn't too bad after the requestor had been billed for initial studies, system design, conversion, programming, testing and the new computer processing time.

I am not stating that all computer systems should be a carryover from tab procedures, but each system should be evaluated as a separate entity; then plan the best approach to an expedient, quality system.

In relation to the programmer having 10 "test shots" a day, this indicates that desk checking and proper programming analysis is lacking. A programmer should not be doing other things besides programming and working on improving and expediting his program methods.

A good organization should at least have a control "closed shop" or a complete "closed shop." Operators should do the testing with the proper instructions from the programmers.

William D. McCarter
Assistant Vice-President,
Systems/Programming Mgr.
Bank Virginia Service Co.
Richmond, Va.

Lack of Discernment?

In reference to E.J. Krayer's letter [CW, March 21] complaining of the shortcomings of Brand I software, and proposing still another professional society for RPG users (incredible!!), I suspect he is paying for a lack of discernment at hardware selection time. I wonder if the choice was his?

T.E. O'Connor
Mountain View, Calif.

Useless Experience?

Clearly, the opportunities to reduce inventory by $500,000 after learning to program in half an hour [CW, Letters to the Editor, Feb. 14] are limited to the worst-run companies in the country.

Just as clear should be the point that experience in reentrant BAL is probably useless in an RPG shop.

W. Fitzpatrick
Long Beach, Calif.

A Last (?) Word on IBM and Individuality

Viewpoint

By James P. Fraser
Special to Computerworld

The letter from Johnnie Jackson [CW, Feb. 28] is not of interest in itself, because I periodically see this minority viewpoint of supernatural reverence for IBM in *Computerworld*.

What is of considerable interest is the immediate and vociferous response which always accompanies such a letter. One would almost think there is a significant percentage of persons in the DP community who actually think for themselves and possess the courage to be an individual.

The very same decision maker in hardware selection who bemoans IBM's arrogance consistently (or is it inconsistently) demands more of an independent than he does of Big Brother. He rationalizes by claiming his system is unique and possesses fantastic schedule requirements, which are so critical it would ruin the entire economy of this country if it were shut down for three minutes.

Massive ego is generally a corollary of massive insecurity. The small percentage of data processing professionals who have accurately appraised their company's requirements and profit goals have been the only persons with enough courage to select equipment on merit.

The historical record is absolutely clear that independent peripherals have performed with greater capability, at less cost, than similar IBM equipment.

It is the purchasers of this equipment in whose debt all the parasitic (there's that word again, but at least in proper context) *buyers* of IBM equipment have enjoyed significant price reductions.

For the Johnnie Jacksons of the world who are insulated from the real world of cost consciousness, I have nothing to say.

For the rest of you, I have a warning! In the coming years, because of your inaction and indecisiveness, IBM could well have a monopoly. So what, you must wonder, I'll still have "mine" (career, position, job, etc.). You probably will and I am sorry for you.

When you are consistently told the hardware to use, the programs available, the kind of data processing person you should be – don't be surprised if you have lost something else along the way, yourself.

Further, when jobs are so categorized and computerized, don't be shocked at the salary levels developed under this kind of closed structure. After all, when creativity and individuality are not a required part of a job, who needs someone with more than a modicum of intelligence.

Computer Lists Office Space

SYDNEY, Australia – Companies seeking office space in Sydney can now use a computer to select their exact requirements.

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Random Notes

'Mister' Controls Projects Through Infonet T/S Service

LOS ANGELES – Construction and other project-oriented managers can gain long-range planning facilities and control of current operations through the Management Information System for Time, Expenses and Resources (Mister) just installed in the Infonet time-sharing network by Computer Sciences Corp.

Mister allows management to project as much as a decade ahead, which might be particularly appropriate, CSC suggested, for chemical processing and pollution control projects, and for product research and development in hard goods.

NCR Adds Business Applications Using 'Mag-Stripe' Cards on 399s

DAYTON, Ohio – A four-part accounting system – including payroll, accounts payable and receivable and general ledger and financial reporting – has been released by NCR for users of the NCR 399 accounting computers, equipped with magnetic stripe ledger card reading capability.

There are two versions of the payroll system. Payables are handled on an open-account basis while receivables processing is done on open-item accounting. The packages are available for one-time license fees ranging from $750 to $900 each, an NCR spokesman said.

Varian 73 and 620 Users Offered Enhanced Pert Under MOS, Vortex

IRVINE, Calif. – Users of Varian's 620 or 73 computers running under either the Master Operating System (MOS) or Vortex can generate Pert reports in batch mode with new software from the hardware vendor.

The updated program, written in ANS Fortran, accepts directives and networks as inputs and generates full-scale analyses as output. Large networks can be input in condensed form for later revision and processing, the company said. Provided free to MOS and Vortex users, the Pert package is available in stand-alone object code for $300.

Data General Has RJE Support

SOUTHBORO, Mass. – A Nova-based computer system operating under either RTOS or RDOS can act as a programmable remote job entry terminal to a 360/370 or to another Nova, with new system software from Data General.

The program performs communications support functions including accepting jobs from an operator, sending and receiving blocked data and routing received data to the appropriate ouput device.

It uses IBM's Binary Synchronous communications procedures, and requires 8K words of memory, a real-time clock and Data General's 4074 synchronous line adapter.

U.S. TG-10 Reports:

CPE Guidelines Need Full-Time R&D

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. – Nearly two years after being asked to recommend guidelines for the use of computer performance evaluation (CPE) tools and techniques, Federal Information Processing Standards Task Group 10 (TG-10) has told the National Bureau of Standards that a far greater effort is needed.

TG-10 recommended that a full-time CPE guidelines development and testing group should be established at NBS and given a rather closely defined series of tasks to bring order out of the present CPE confusion.

Hard to Define

TG-10 noted that suggestions, both general and specific, "would be welcomed by the growing CPE community," but that in its limited study the task group could not identify any all-encompassing guidelines – this despite the fact that many of the group's own members are active in the use of CPE products.

These products include hardware and software monitor systems, run-time analyzers, computer system simulation systems, coding optimizers, job-accounting modules and work schedulers.

The basic problem in trying to bring this together is that the differing architectures of computers coupled with the numerous applications to which they can be assigned "produce an extremely large range of potential performance improvement methodologies," the report explained.

To bring these methodologies into focus, the proposed group – made up of representatives of three federal agencies, a computer manufacturer, a CPE product vendor and a CPE consultant – should break its study into separate areas.

First, TG-10 suggested, the group must develop sets of terms and their definitions to describe CPE tools and techniques.

Then it should develop another set of terms and definitions to describe the physical, architectural and functional characteristics of computers, components and computer systems which may be measured and evaluated.

Matrix Necessary

With those two general sets of terms established, the guidelines group should construct a table or series of tables in the form of a matrix matching the tools and techniques against the characteristics that can be measured.

Later, the group should get into the evaluation of the CPE products themselves, and of the existing or new measurement parameters on the computers or components.

The impact of particular application areas on CPE operations should also be studied, TG-10 told NBS.

A new comprehensive government-wide survey should be undertaken to determine the true use, cost and benefits of CPE.

TG-10 chairman Michael Morris of the Federal Simulation Center explained that this survey should in fact determine whether any of the proposed research and development work is worthwhile. If the government's current CPE effort is still minimal, he said, it would be hard to justify the $1 million budget and 19 man-years of effort TG-10 proposes.

Since the federal agencies, computer manufacturers and CPE product vendors all stand to benefit from any meaningful guidelines the study group may develop, they should be willing to underwrite the cost of any products or people they provide, TG-10 said.

'MAS' Builds Precoded Pieces Into Large Customized Systems

BALTIMORE – Manufacturers and distributors using 360 or 370 CPUs can gain many of the processing niceties of custom programming and the controlled cost of "packaged" software through the Modular Applications System (MAS) approach from Martin Marietta Data Systems.

Developed originally by Hoskyns Group Ltd. of London, MAS is a set of six applications designed to operate, if desired, as one massive integrated system. But it is made up of small blocks so that any part can be effectively tailored, without "heavy" custom work.

The six basic applications are inventory; cost and production control; order processing; financial accounting; and business planning. These six, in turn, break down into 20 basic modules.

Production control, for example, may include scheduling, expediting and performance reporting elements, while cost control covers job/batch costing, standard costing and standard cost generation capabilities. Business planning supports resource planning, budgeting and forecasting.

Sales, invoicing and purchase order control are available as elements within the order-processing system. Inventory also includes three possible elements: recording, management, and material requirements planning.

Written in Cobol

The MAS modules are written in ANS Cobol and intended for use under either DOS or OS/360. The elements vary somewhat in size but even the largest module requires no more than a 48K-byte partition in main storage and two 2311 or equivalent disk packs.

Even with the modular approach, some custom work may be required and MAS installations include a "fair bit of system planning and support" from Martin.

One spokesman said, however, that the entire system – including all six applications and reasonable support – would cost about $150,000.

The programs are usually provided in object code, on magnetic tape, along with considerable customized user documentation, he added.

Martin Marietta Data Systems is at Hampton Plaza, 300 E. Joppa Road, 21204.

Interface Eases Isam Programming

CAMBRIDGE, Mass. – Coding programs using Indexed Sequential (Isam) disk files is simpler and potentially more flexible for users of IP/Isam, a package from ADL Systems Inc. that acts as an interface between the system software and application logic.

IP/Isam's major function, according to ADL, is to add a significant capability for system-controlled file management and simultaneous file accessing in multiprogramming environments.

Avoids Access Conflicts

It allows sequential and random processing to be intermixed at the application program level. The interface also manages accessing requests to prevent conflicts between simultaneous accesses to the same record by two or more programs.

Such conflicts would be important only if one or more of the requested accesses involved updating data on the record. The new package permits multiple programs to gain read-only access to the same data set simultaneously.

IP/Isam enables application programs, written in any language in which a standard parameter list can be specified, to utilize the full range of Isam facilities.

IP/Isam also provides a range of "housekeeping" facilities, including the reporting of file error conditions to the problem program. It also extracts and reports file statistics and reorganization information to the user programs, and certain processing attributes can be modified dynamically by the interface during program execution.

The IP/Isam package operates under OS/360-370 in either MFT or MVT. All Isam functions, including Qisam and Bisam modes, are supported.

It is available in object form – cards or magnetic tape – for $3,000, from the firm at 25 Acorn Park, 02140.

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'Ulysse' Accepts Multiple Languages, Tailors Prestructured Logic to Fit

CHICAGO – Businesses with international DP development operations based on even small-scale 360 equipment can allow programmers to work in their own native languages and still share the resulting programs, if they are written in Ulysse, a prestructured language system now available from Gauchot Information Systems, Inc.

Ulysse falls somewhere between Cobol and RPG in user convenience. Perhaps its most unusual feature is inclusion of translation tables that check the user's source language – French, English, Spanish, Dutch or German – for syntax. A second pass performs the actual assembly of the program, including generation of an object deck.

For applications that do not require retention of an object deck, Ulysse can be run in load-and-go mode. The assembler itself is self-relocatable so that it can be used in any partition available under multiprogramming.

Own Logic

Like RPG, it provides its own basic program logic, allowing the selection of appropriate input records, detail printing of data from the records, sensing of control-level break and printing of subtotals before "rolling" them forward into grand totals. But Ulysse doesn't require multiple coding forms, each geared to a particular part of the preprogrammed cycle, the firm said.

Ulysse coding is free-form, controlled only by key words, similar in function to reserved words in Cobol. Several of these are used to identify "chapters" or general sections of coding devoted to such tasks as beginning the job, handling control breaks, preparation of report titles or user-coded processing of individual records.

The system supports all sorts of I/O including Isam or direct-access disk files, magnetic tapes and cards. But it breaks away from "normal" high-level language usage by not supporting symbolic names for data fields.

Users must identify fields by start position and length. This avoids the hazards of nonsense data names, as Gauchot spokesmen are quick to point out, but it also eliminates the convenience of being able to follow procedure logic without referring to a layout form of the input or output records.

Several Operators

Whatever problems the data reference scheme might cause, once the user reaches the material he needs, he has a full range of operators available. These include basic arithmetic functions, but also an "endless" COMPUTE, and comparisons including ANDing and ORing.

The system can be used on DOS/360 configurations, where it requires no more than 11K bytes for the compilation process, or on OS/360. The DOS version is available for $1,000/mo; the OS version costs $1,200/mo.

Gauchot is at 2 N. Riverside Plaza, 60606.

CPL1, PL/I Subset, Gains 'EL' Option

PARIS – An extensible language (EL) option, now available for use with Version 3 of the CPL1 subset of PL/I, from Centre d'Analyse et de Programming (CAP), provides users with a fast and essentially open-ended compilation system – and one that can be installed on a broad range of CPUs.

CPL1 is seen by its developers as a replacement for assembler language and is said to produce "reasonably short code" on any machine.

After the first compiler step, CPL1 source code is translated into macro-instructions which can be tailored to the user's special needs.

This macro capability is provided without the cost in machine time usually associated with such facilities, CAP explained, by redesigning the code generator.

The extensible language option, called CPL1-X, goes further than the macro facility. It allows the user to define the detailed generation of code, triggered by some syntactic elements and appearing as in-line functions and pseudo-variables in the source code.

In effect, this means the user, after defining the extensions, can code a program in terms appropriate to the application and familiar to him, rather than being limited to "DP terms," CAP said.

A bootstrapping technique has provided operating versions of the CPL1 processor on IBM 360 CPUs, under both OS and DOS, and on GE (now Honeywell) 600 series equipment and the Xerox Sigma 7, as well as on Iris 50 and 80 and CII 10070 units. Cross-assembler versions that use a 360 as host for programs to be run on Honeywell 6000 CPUs are also available, the company noted.

The basic Version 3 system for 360 or 370 installations is available for about $1,300, or on a lease agreement for about $330/mo. The CPL1-X extensible option costs about $110/mo, CAP said. Maintenance is also separately priced.

The company is at 21, rue Leriche- 75, Paris 15.

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Data Briefs

Printing Enhancements Upgrade 33 TTY Features

Model 33 TTY users can print 132 character lines and use both upper- and lower-case printing with two recent enhancements.

For $77.50, users can change their 72-print position ASR-33s to print 132 char./line with the Teletype Modification Kit from Remote Data Terminals, 2928 Nebraska Ave., Santa Monica, Calif. 90404. The TMK-132B includes a carbon ribbon and print cylinder with narrow characters to print the increased positions on a standard TTY carriage with no degradation in speed, the firm said.

Upper- and lower-case printing for either the ASR or KSR 33 is available from Data Terminals & Communications, Box 5583, San Jose, Calif. 95150.

The DTC-2 conversion allows upper and lower case to be generated from either the TTY's own keyboard or by the sending device attached to the terminal. The DTC-2 is compatible with paper tape punches and costs $195.

Modem Made for Multidrop Nets

SILVER SPRING, Md. – Rixon, Inc. has a new data set for multidrop polled networks and point-to-point systems.

The DS4801 operates at strap-selectable speeds of 4,800- or 2,400 bit/sec over unconditioned C1 or C2 telephone lines.

The data set can be used in a continuous or controlled carrier mode. The unit costs $3,750 and is available from stock. Rixon is at 2120 Industrial Pkwy., 20904.

Terminals Get Upper, Lower Case

CORNWALL HEIGHTS, Pa. – Delta Data Systems Corp. has added an upper/lower case capability to its 5000 Series of video display terminals.

The new units use a larger than normal 7x9 matrix format and can display 27 lines of 80 characters each. Other features of the 5000 Series include programmable keyboard and paging. The terminals are available for Teletype and IBM 2260/2848 compatibility.

Prices range from $3,000 depending on the model. The upper/lower case option is $600 or can be added in the field for $800.

Delta Data is at Woodhaven Industrial Park, 19020.

Guide Lists Terminal Equipment

OAK BROOK, Ill. – A terminal user's supply guide for the remote computing, time-sharing and data communications industries is available from Remote Computing Supplies.

Products listed in the catalog include continuous forms, teletypewriter paper, ribbons, paper tape, tape-handling equipment, binders, binder storage equipment and acoustical shields.

The catalog is free from Remote Computing, 1211 West 22d St., 60521.

Value-Added Services

MCI Proposes Data Transmission Net

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – Microwave Communications, Inc. has filed an application with the Federal Communications Commission for authority to provide a turnkey computer/communications service with hardware and software specifically for data users.

Described as a hybrid data service, the offering would combine minicomputers, terminals and communications facilities into an end-to-end network. The service would be similar in many respects to that proposed by Packet Communications, Inc. [CW, Feb. 7] and the network now being operated by the Advanced Research Projects Agency (Arpa).

Switching, Formatting . . .

Unlike MCI's earlier proposals which provide the user with only a communications channel, the new service would include such functions as switching, formatting, error control and concentration. The service will be provided by MCI Data Transfer Corp. (MDT), a subsidiary formed to operate the computer-controlled network.

MDT will configure its Arpa-like network by leasing lines from existing carriers such as AT&T and Western Union, as well as obtaining facilities from MCI.

Three types of service will be offered to MDT users. The first would be a "throughput maximizer" offering, described as a customized dedicated service.

This service would provide several error-correction options to allow the data user to achieve maximum rate of data transfer at minimal error rates. It would include minicomputer-controlled packets of information transmitted from point-to-point.

This type of service might cost from $500 to $2,000 per channel depending on the amount of customized value-added capability, the application said.

A second type of service will provide priority concentration of data to fixed destinations. This would be a packet-switched shared service for many users who would be charged according to message size and priority of transmission desired.

Included would be Fast Batch (transmission within three minutes); Regular Batch (transmission within 60 minutes); and Bulk Service (overnight transmission). A typical cost of a channel might be about $3,000, the MDT application estimated.

A third service would be similar to the priority concentration but would be expanded to addressable, instead of fixed, destinations to allow the user to select the points on the net to which his messages would be transmitted.

Actual MDT costs would depend on where the network was configured, which in turn will be a function of where user service is required. MDT envisions a 30-city network with service to an initial 15 cities beginning about 18 to 24 months after FCC approval.

MDT is the second value-added proposal presented to the commission. The first such application was filed by Packet Communications, Inc. Two other firms, Telecommunications Network, Inc. and Telenet Communications Corp., plan to file similar applications.

Aloha Communications System Connects Hawaii to Arpanet

By Sasha Yasinin
CW Hawaii Correspondent

HONOLULU – The University of Hawaii's Aloha system is scoring innovative advances in satellite computer communications with an experimental satellite system which went on-line here recently.

The university also is involved in a joint study with the Advanced Research Projects Agency (Arpa), Bolt Beranek and Newman, Xerox and UCLA to design suitable protocol for packet communications via satellite.

Experimenting With Aloha

As part of this project, Aloha becomes the first subscriber to a digital communications subsystem installed between the Comsat ground stations at Paumalu, Hawaii, and Jamesburg, Calif., last year.

With this installation Aloha becomes the first operational satellite node on Arpanet, via the Intelsat IV satellite over the Pacific.

The Comsat system enables data to be transmitted at the rate of 50 kbit/sec over a single voice-grade channel.

The single satellite channel can provide two up-link and two down-link data channels and each of these four channels could be simultaneously available to any Comsat ground station in sight of the satellite.

Aloha's director, Norman Abramson, sees this use of voice-grade channels as a big money-saver for computer communications.

As an example of the system's cost-saving potential, Abramson pointed to the possibilities in the next generation domestic satellite system.

"Each of these satellites," he told *Computerworld*, "will have 12 transponders with a bandwidth of 45MHz or so. If one of the potential carriers were to devote one transponder on the satellite to packet communications, it would be possible to transmit data at about 10 million baud. This single transponder could handle some five million on-line terminals.

"Converting to this kind of communications could save a lot of money. For example, Arpa spends in excess of $1 million per year for line charges. With this much money it could buy a transponder on a domestic satellite.

"If computer users are ever going to be free of incredibly high costs of transmitting data, some system similar to this has got to be set up," Abramson said.

But Abramson foresees difficulties with potential carriers in the next generation system devoting a transponder to packet data communications. He sees problems with regulatory agencies in determining how to charge for the service.

Touch-A-Matic Phone Can Store Numerics

MURRAY HILL, N.J. – The Bell System will soon offer a telephone with a built-in memory that could be used to transmit up to 15 numbers with the push of a single key.

To be called Touch-A-Matic and developed by Bell Labs, the phone will be able to store up to 32 "pre-recorded" numbers. Although primarily designed to record and store frequently called telephone numbers, each of the 32 positions could also be used to store up to 15 digits of data to be transmitted to a CPU, a Bell spokesman said.

The phone with a memory could be used in voice-response systems where connect times would be reduced by automatically "dialing" the computer through use of a prestored number. A 7-digit called number could be dialed in "less than one second," by depressing a single key, the spokesman said. The full 15 digits would take "less than two seconds."

Thirty-one of the keys on the phone usually contain the frequently called numbers. The remaining position accesses a "scratch pad" memory which records the last number dialed. To redial the last call, the user would push that button.

The first Touch-A-Matic units are scheduled to be installed at Sears Roebuck in the second quarter of 1974. Illinois Bell is expected to file the first tariff for the device. A projected monthly cost has not yet been set, but a Bell spokesman said it would be higher than a conventional telephone.

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TWX 910-379-6567

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Remember when you took me to see the magician that sawed the lady in half?
Vadic has just done the same thing to line costs!
Believe it or not, they have a modem capable of full duplex data transmission at 1200 bits per second over dial-up or two-wire leased lines.
Think of the impact this will have on users of CRT's, cassettes, and all sorts of buffered terminals who have been forced to piddle along at 300 bits per second or live with half duplex 1200 bits per second operation.
This modem is really something, Ma. It provides four times the data rate of your 103 while maintaining the same line discipline for connect, hand shaking, and disconnect. Imagine eliminating the complicated and inefficient half duplex mess forever. The zero turn around delay will save bundles on line costs.
I hate to tell you, Ma, but the VA3400 can be used in Vadic's Multiple Data Set or standalone units which have analog and digital loopback, display of all EIA interface signals, built-in 300 and 1200 baud test signals. It can also be used with any of Vadic's automatic dialers.
The price? Better sit down, Ma. Just $750, with OEM discounts available.
Delivery is 60 days ARO. Better phone your order in soon.
P.S. Who's Vadic? They've delivered over 20,000 modems to date.
Your independent thinking son,
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GAO Finds 'Significant' Cost Savings With Multiplexing on Low-Speed Lines

CW Washington Bureau

WASHINGTON, D.C. – "Significant" cost savings are available within the government through the use of multiplexing for low-speed data circuits in both the civilian and military sectors, according to a recent report from the General Accounting Office.

The report, while it analyzed only government data communications needs and practices, could be important for large commercial data communications users since it clearly spells out the scope of the savings available through multiplexing.

For example, the study, which covered 200 circuits operated by both civilian and military departments of the government, found that communications costs could be reduced by over $400,000 per year through the use of multiplexing on those circuits.

Getting Together

In one case, the GAO team found that 54 separate circuits leased for eight agencies could be replaced with just one multiplexed circuit between Florida and the Washington, D.C., area if the agencies would work together.

"The multiplexed system [in this example] costing about $72,000 would result in savings of over $50,000 per year compared with current circuit costs," the congressional watchdog agency said.

For example, the GAO reported that the Department of Defense leases, at a cost of around $15 million annually in taxpayers' money, 3,200 circuits of the type that are included in the study – "many of which appear susceptible to multiplexing."

In addition, GAO noted that civilian agencies also spend a significant sum on leasing the low-speed type data channels that were covered in the report.

It also noted that the cost of the type of circuit reviewed by the study had risen dramatically for the government over the past few years, indicating the government was now paying about 21 cents per mile for such circuits while it had paid only two cents per mile for similiar circuits as recently as 1967.

Multi-Speed Savings

GAO also said that systems covered by the study only included the low-speed type of circuit, and it noted that multiplex equipment "capable of handling higher-speed DOD and civil agency requirements is available" which could further reduce costs for these circuits.

The GAO report noted that "although multiplexing has been available since June 1968 when the Federal Communications Commission removed restrictions on the use of interconnecting devices not furnished by the common carrier, federal agencies have made little use of the technique."

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Terminal Features Seven-Color CRT

NORCROSS, Ga. – The Spektracolor 700 terminal from Integrated Systems, Inc. features a 7-color CRT programmable keyboard for complete graphics capability and a programmable controller for on-line communications functions.

The user can program 32 keys to generate any graphics symbols in seven colors or generate black symbols on any of seven colored backgrounds.

The keyboard also includes a 64-character Ascii set, blink mode, tab and built-in cursor. Light pen is optional.

The programmable controller can drive up to four interactive keyboard CRTs and can support any number of one-way monitors. Standard interface is EIA RS-232C at speeds up to 4,800 bit/sec; parallel TTY interface is optional.

A single terminal including controller and one keyboard CRT costs $14,300. Extra keyboard CRTs are $9,000 and a CRT alone is $1,900. Integrated Systems is a unit of Esterline Corp., 2315 Interstate 85, 30071.

Digital Cassette Units Have Standard, Loop Interfaces

ENGLEWOOD, Colo. – Electronic Processors, Inc. has introduced the STR-Link Series Digital Cassette Systems for data transmission and reception.

Using the firm's STR-200 or STR-200I digital cassette recorders for incremental or block recording respectively, the system incorporates a standard RS-232 interface as well as a 20mA current loop interface. An 8-bit parallel interface is also available on some models.

Available with either single- or dual-cassette drives and having a self-contained power supply, the STR-Link units support data transmission rates from 110 bit/sec to 1,200 bit/sec, depending on the number of drives, the interface and the application involved.

Single drive units are priced at $890 while a dual-drive unit costs $1,700 from 5050 S. Federal Blvd., 80110.

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Here's just some of what's happening at the 1973 Computer Users' Forums.

And it'll be happening soon in a city near you:

BOSTON – Despite the proliferation of non-Bell data equipment, many users are still reluctant to [illegible] independent communications carriers at the Computer Caravan/73 Users' Forum in Boston. Most agree that a Computer Caravan/73 [illegible]

BOSTON – A major advantage of line data entry is that the process of finding out errors as they occur rather than save them for a later edit cycle, according to Herb Cronin, assistant vice-president of Boston's First National Bank.

Cronin's which [illegible] 370/155 [illegible] systems.

"We're looking at a key-to-disk system," one user noted, "and the forum on these systems plus the three displays on the [illegible] available and what the problems might be. In fact, we had never heard of one of the exhibitors before it was mentioned in the panel discussion."

BOSTON – "Conditioning" – to assure effective data transmission – is often one reason cited for a user's move to private lines, but nowhere in the Bell System does the carrier automatically provide preventive maintenance to assure the conditioning. Overlan, assistant telecommunications manager for First National Boston, told a Caravan/73 audience on leased-line usage.

To Mix or Not

Thibault advised users who choose multivendor systems to bring each vendor in one at a time and explain what is expected from him in the mix.

"Ask him at that time if he will have any problem maintaining his equipment with the other vendors' units also on the line."

Once all vendors state they can provide proper service, bring them all in to a group meeting – before any contracts are signed – and explain the [illegible] and rules of responsibility.

Zayre Corp. has found the [illegible] lation of an IBM 1287 more than justified on one application alone.

Any other applications later put on the scanner "are pure gravy," according to Zayre's Noel Goulston at the OCR workshop.

BOSTON – Sometimes all the in-house staff knows – even after a packaged system has been considered operational for six months – is that "it seems to work," according to Paul Ladd, programming manager for Worcester (Mass.) County National Bank (WCNB). It may be as much as a year after the initial use of a system before the user knows enough to see where and how he might like to modify the program logic.

Star Market DP director Donald MacKinnon told the Computer Caravan/73 software evaluation panel he would never contract for custom programming of an application that he knew was going to entail heavy maintenance. Systems [illegible] as payroll, with its [illegible] tax routines [illegible] house, he advised, the main[illegible] programmers know the program[illegible]

In all, more than 300 users attended sessions on data entry, data communications and installation management, each given on a separate day.

The Users and Panelists attending Forums in the beginning of our tour have exchanged a wealth of information on a wide range of topics. Information you can't get in books. Experience-based information from the people who've been through it. User talking to user in shirtsleeve workshops, panel discussions and seminars. It's a unique exchange of information that will benefit you and your company.

FORUM TOPICS

Day 1 – Data Entry – Including keypunch replacement (shared Processor), Intelligent Terminals, OCR, and Direct (on-line) Data Entry.

Day 2 – Communications – Including Data Transmission (dial-up and leased lines/broadband) and Equipment Selection (communications processors and control equipment).

Day 3 – Installation Management – Including Personnel recruitment and training, Programming management and independent peripherals (including memories).

OPEN SESSIONS

Each afternoon features a new, open session for all those who wish to attend. A different subject will be opened up each day at 2:30 for discussion and controversy.

Day 1 – Data Communications Planning
Day 2 – Software Evaluation Panel
Day 3 – Small Systems Panel

PANELISTS

Next stop: Chicago. And here are some of the panelists who will be there: George Davisson, International Harvester; Vern L. Schatz, Jewel Companies; David Rappaport, University of Illinois Medical Center; Jack Hanna, C&O/B&O Railroad; Kenneth Bolgman, R.R. Donnelly & Son.

Send in your reservation form now, and your space at the 1973 Computer Users' Forums will be reserved.

The Computer Caravan/73

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Computer Users' Forum Registration

Name_____

Title_____

Company_____

Address_____

City_____

State_____ Zip_____

1. Please circle one number in each category.

(This information is necessary to provide a better forum for you.)

YOUR INDUSTRY

01 Mining/Construction/Oil & Refin.
02 Manufacturing – Computer or data system hardware, peripherals/ other associated mechanical devices
03 Manufacturing (other)
04 Utilities/Comm. Sys./Transport.
05 Wholesale/Retail
06 Finance/Insurance/Real Estate
07 DP Serv. Bureaus/Software/Plann.
08 Business Services (except DP)
09 Education/Medical/Legal
10 Federal, State and Local Govt.
12 Communications/Printing/Publ.
13 Other:_____

YOUR FUNCTION

01 Corporate Officer
02 Data Processing & Other Operational Management
03 Data Processing Professional Staff
04 Consultant
05 Lawyer/Accountant
06 Engineering – Mgmt./Scientific/R&D
07 Sales/Marketing/Account Exec.
08 Librarian/Educator
09 Other:_____

2. Please check the appropriate city:

____ Kansas City, Mo.	April 11-13 (Wed, Thur, Fri)	Municipal Auditorium (Forums & Exposition) Muehlebach (Hotel Rooms)
____ Chicago	April 17-19 (Tues, Wed, Thur)	Conrad Hilton Hotel
____ Cleveland	April 24-26 (Tues, Wed, Thur)	Convention Center (Forums & Exposition) Sheraton Cleveland (Hotel Rooms)

3. Check the day(s) you will attend the Forums.

☐ Day 1 – Data Entry – 9 am-2:30 pm
☐ Day 2 – Data Communications – 9 am-2:30 pm
☐ Day 3 – Installation Management – 9 am-2:30 pm
NOTE: Afternoon Sessions are open to all – free of charge.

4. Your enclosed check will cover all workshop materials, luncheon, Forum admission and admission to the Exposition Hall (make checks payable to "The Computer Caravan")

☐ One Day – $25.00 ☐ Two Days – $50.00
☐ Three Days – $75.00

All Tickets will be held in your name at the door

Exposition only tickets (no forums or luncheon) are $5.00 and should be purchased at the door (ticket good for all three days).

Return this form to:

Frani Blackler
Computer Users' Forum
797 Washington Street
Newton, Mass. 02160

For additional registrations, copy this form – or write for extra copies.

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COMPUTERWORLD
April 11, 1973

The Computer Caravan/73

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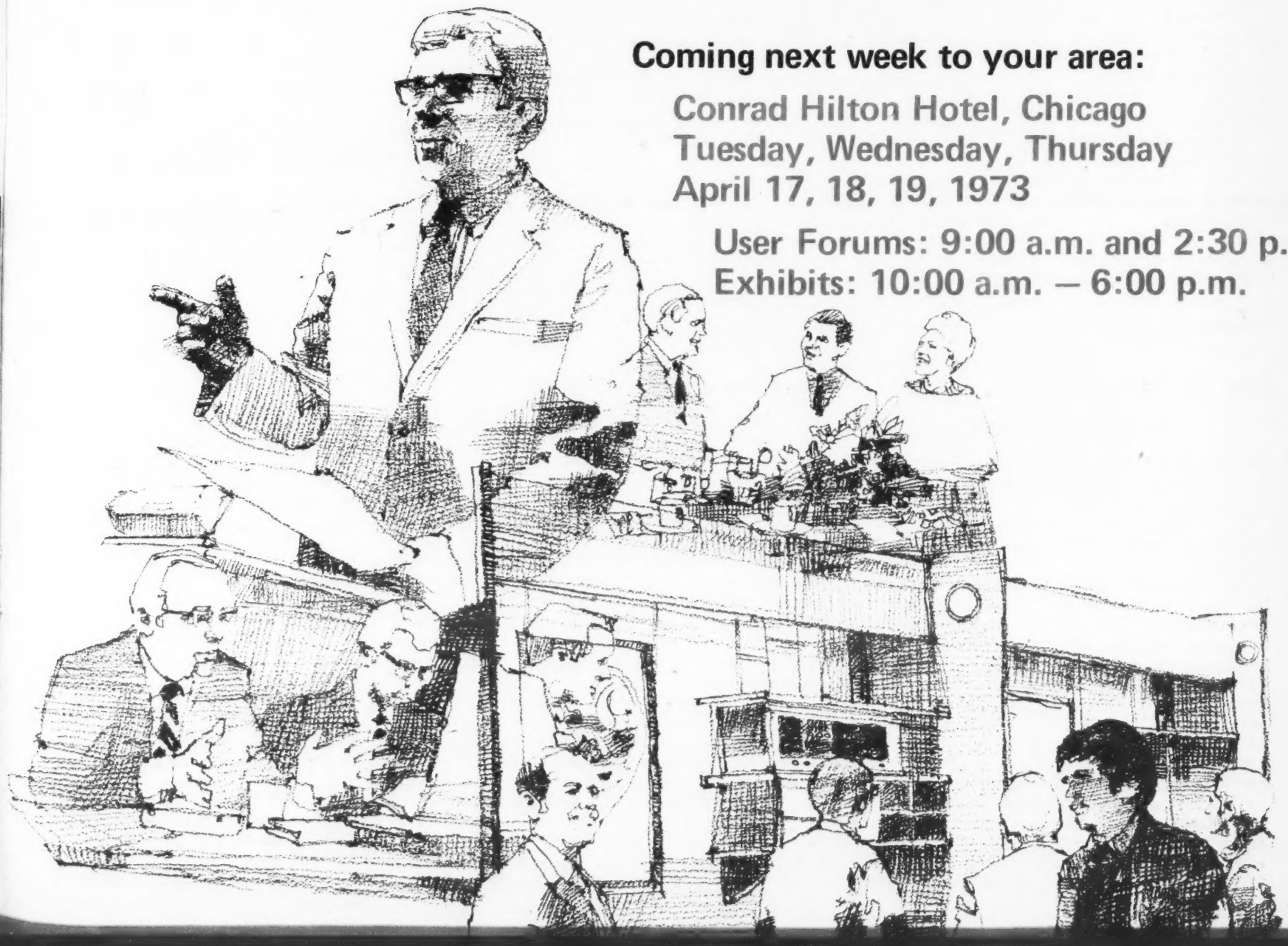

Coming next week to your area:

Conrad Hilton Hotel, Chicago
Tuesday, Wednesday, Thursday
April 17, 18, 19, 1973

User Forums: 9:00 a.m. and 2:30 p.m.
Exhibits: 10:00 a.m. – 6:00 p.m.

All Attendees Welcome At Afternoon Sessions

Day 1: Hoxie Hits New 'Commo' Lingo

Data Communications jargon is expanding rapidly as technological developments bring new facilities and devices to the markeplace, says consultant Gilbert H. "Gib" Hoxie.

However, he has found that certain often neglected management aspects of data communications planning usually tend to outweigh esoteric technical factors.

Hoxie, a manager in the Informaton Systems Division of Booz, Allen & Hamilton, Inc., addresses the topic of Data Communications Planning on the opening day of the Computer Caravan.

He believes systems planners intending to install or expand data communications applications would be wise to include a "wide range of management considerations" in their analysis.

Answers to the nine questions below may be "key to designing the right system," Hoxie adds.

1. What information systems do we have (need) and why?
2. Which applications require data communications?
3. How well do alternative data communications systems satisfy requirements?
4. What will be the true one-time and operational cost?
5. What will be the true one-time and operations benefits?
6. What will be the impact on users and work-flows?
7. Who are the vendors, and what are they selling?
9. What techniques are most effective in selecting and presenting the best design?

Hoxie attempts to answer these questions during a tutorial on Data Communications Planning, given at 2:30 P.M. on opening day of the Computer Caravan. The open, general session may be attended by people wearning any Computer Caravan badge, i.e. exhibitor, exhibitor-guest, exhibits-only, or Forum program for any day.

Although the presentation will last about an hour, it is anticipated that attendees will have questions for Hoxie.

Beware: Intangible Benefit

Hoxie does not believe in "intangible benefits" of systems, or at least not during the process of cost justification.

"If an analyst can't hang a number, or range of numbers on a 'benefit,' he has no business citing it even as particial justification for a system," he remarks.

"Intangible benefits," which he regards as one of the "major pitfalls for systems planners," only represent "snares and delusions for the individual who must select an alternative, and he is bound to come out on the wrong end of any ensuing conflict," according to Hoxie.

He thus advises that "80% to 90% of intangible benefits can be quantified and user commitments obtained. Those that can't be defined and sized, usually are excluded from the benefits analysis and if they appear in a report at all, are downplayed."

Hoxie's speech is an addition to the Caravan program, in that any Caravan attendee is eligible for admission; it actually sets the stage for the middle-day Forum program, which is devoted to management and operational considerations of data communications.

Last year, three "keynote" speakers toured the country with the Computer Caravan, but the time for these speeches has been given over for extended panel discussions and workshops, a direct result of feedback from the users who attended the 1972 Forum.

The workshops resume after lunch, concluding at 2:30 P.M. At this time, Forum and Exposition attendees may sit in on the open, general sessions on each day. Hoxie's tutorial is given on the first day, a Software Evaluation panel takes place on the middle day and a Small Systems panel is held on closing day.

President's Message

The basic concept of the Computer Caravan is: a national computer conference that travels to you, the computer user.

The fact that the people staffing the exhibit booths are, for the most part, local sales representatives will be appreciated by all those who visit the exhibit. These representatives of DP suppliers will still be here, long after the Caravan has departed.

The idea of tailoring a national conference to the needs of local users is carried to a higher degree by some of the individual exhibitors, who have planned special seminars oriented towards their particular product or service.

Attendees at last year's Caravan said they liked this type of individualized presentation, and more exhibitors have responded by scheduling these seminars.

Whether your main interest is in hardware, software, or services, the leading companies in each sector of the EDP industry are found in our exhibit hall. Both their sales and their technical personnel are prepared for your probing questions on their products, many of which are being introduced on the Caravan, while others are already proven in the field.

Your comments on our program are welcome. Feel free to note your suggestions with *Computerworld* representatives on the exhibit floor, or in the *Computerworld* booth. We are here to serve you; please tell us how we may best accomplish that goal.

Patrick J. McGovern
President, Computerworld, Inc.

Day 2: Panel Probes Software Sources

The Software Evaluation panel is one of three "open" sessions that take place during the afternoons of the Computer Caravan.

These sessions may be attended by people wearing any caravan badge, such as exhibitor, guest, exhibits only, etc.

The Sofwtare Evaluation panel is aimed at examining various sources for applications and utility software; paraphrased, it is a "make-or-buy" round-table discussion, and the audience will be invited to take part.

In general, panelists will follow the outline below. If time permits, questions of a broader nature will be entertained.

I. Evaluating the alternatives
- Where do you start
- The main criteria, how to weigh them
- When you have done enough looking?

II. Pricing, measuring techniques (this relates to first topic, but might be more specific as to cost/CPU time/volume of reports, etc.)

(Continued on S/Page 5)

Day 3: Small Systems Described by Users

Small businesses with computers and businesses with small computers are not necessarily identical, but they will be sharing the stage during our Small Systems panel, on the afternoon (2:30) of the final day.

This panel is designed to give a broad overview of the types of systems available, and the problems and opportunities presented by these computers.

In many instances, such systems are chosen by company presidents with little or no DP experience; in other cases, on-line systems may be operated by clerical personnel.

In all cases, it appears small computers are proliferating the business community at an unprecedented rate, and this panel session attempts to take a snapshot of local small-computer usage today.

Again, panelists will be following the outline below, and any questions of a broader nature will be taken, if time permits.

I. Planning
- Discovering the need (growth; new business;

(Continued on S/Page 5)

Many Titles Suit DP Conferences

Few generalities can be applied to the Computer Caravan, with one possible exception: computer conferences are many things to many people.

The 1973 edition of *Computerworld's* traveling show is the distillation of user and exhibitor recommendations after our 1972 debut; most people approved of the local concept, since it afforded them an opportunity to speak with users and DP suppliers from their own region.

This has remained unchanged.

Again, local and regional users comprise the panel discussions and will be leading workshops.

Again, local sales and technical representatives will be staffing the booths in the exhibit hall.

The Computer Caravan, then, is a management conference with a program geared to increasing the operational efficiency of computer centers.

It is a business exposition, with the latest in computer hardware, software and services on display.

It is a showroom for exhibitors,

(Continued on S/Page 6)

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Visit our caravan booth – or better yet – attend a Cullinane seminar at any of the ten caravan cities.* You'll get all the details on the newest version of the EDP-AUDITOR/CULPRIT system as well as the latest enhancements to the Data Base Management versions (IMS/CULPRIT, TOTAL/CULPRIT, and RDMS/CULPRIT).

The CULPRIT family of systems has been among the most successful in the industry because we've always stayed well ahead of the industry.

If you'd like some idea of how far ahead we've jumped this time, read through the following long (but vitally important!) list of new features:

CULPRIT III

- ☐ Special forms facility allows individual handling for each report calling for special forms.
- ☐ Input record size can now be up to 8,192 bytes long.
- ☐ Procedure buffer size has been doubled in size allowing more procedure parameters to handle very complex reports.
- ☐ Well organized and easy to read input parameter listing
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- ☐ Redefinition of output lines to allow greater output format flexibility.
- ☐ 8-character field names for improved data dictionary mnemonics.
- ☐ New "0" Parameter greatly simplifies certain calculations at total time related to values accumulated at input time.
- ☐ All Assembly Language coding eliminates COBOL modules and reduces core requirements by 3K.

SPECIAL CULPRIT MODULES

- ☐ Parameterized file matching (user specifies size and location of keys at run time).
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- ☐ IBM-DDA file match and expansion modules which are valuable to banks using IBM's Demand Deposit Accounting System.
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- ☐ GE 400 Series tape read module for reading GE 400 tapes directly on IBM computer.
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- ☐ VISAM file read module.
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DATA BASE MANAGEMENT VERSIONS

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- ☐ Also includes all features listed above under CULPRIT.

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- ☐ Information available from the Control, DATA, and XREF portions of RDAM records.
- ☐ Automatic expansion of compressed format data fields to any size desired by the user.
- ☐ Employs cataloguing feature eliminating need to define logical fields in report parameter cards.
- ☐ Processes a virtually unlimited number of strings through the data base.
- ☐ Reads initial driving file in a string either directly or sequentially. All other reads are direct.
- ☐ Direct reads can be based on keys submitted by user and/or keys read from a non-RDMS file.
- ☐ Chaining across files through XREF entries handled automatically by the system.
- ☐ Handles single file record cross referencing techniques (e.g., Bill of Materials organization).
- ☐ Includes all features listed under CULPRIT sections.

TOTAL/CULPRIT

- ☐ Information available from the entire TOTAL record including root and linkage segments.
- ☐ Employs a cataloguing feature eliminating the need to define logical fields in report parameter cards.
- ☐ Processes a virtually unlimited number of strings through the data base. Each string may be several files long.
- ☐ Reads initial driving file in a string either directly or sequentially. All other reads are direct.
- ☐ Direct reads can be based on keys submitted by users and/or keys read from a non-TOTAL file.
- ☐ Linking between files and reading of variable chains handled automatically by the system.
- ☐ Handles multiple linkages between a master and/or variable file (e.g., Bill of Materials organization).
- ☐ Access all types of files.
- ☐ Includes all features listed under CULPRIT section.

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pay $5 at the door . . . or . . . if you plan to attend the Cullinane seminar, drop us a note for free ones (while they last) plus an advance brochure on any system listed above. Cullinane seminars will be held from 4 to 5 p.m., second day of each session, immediately after software forum.

Cullinane Corporation

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Exhibitors Set Special Seminars

The following exhibitors will be sponsoring seminars in the various cities visited by the Caravan. Consult the table below for times and cities. Check with individual exhibitors for exact topics in each city and availability of space.

DAY 1	Boston	Washington, D.C.	New York	Atlanta	Houston	Anaheim	San Francisco	Kansas City	Chicago	Cleveland
2:30 p.m.										
Iomec	★	★	★	★	★	★	★	★	★	★
4:00 p.m.										
Sycor	★	★	★	★	★	★	★	★	★	★
DAY 2										
2:30 p.m.										
Iomec	★	★	★	★	★	★	★	★	★	★
Interdata	★	★	★	★	★	★	★			
ICC	★	★	★	★	★	★	★	★	★	★
Varian*		★	★	★		★				★
3:30 p.m.										
Tektronix			★	★				★	★	
Varian*		★	★	★		★		★		★
4:00 p.m.										
Cullinane	★	★	★	★	★	★	★	★	★	★
Infotron	★	★	★	★	★	★	★	★	★	★
4:30 p.m.										
Varian*	★									
DAY 3										
4:00 p.m.										
Western Union Data Services	★ (may run in all cities based on Boston interest)									
BCS				★						

*By invitation only.

Need Minicomputer application data ?

GET IT IN WRITING AT CINCINNATI MILACRON

When you visit the Cincinnati Milacron exhibit at the Computer Caravan, we won't just talk minicomputer capability . . . you'll get it in writing. Application specialists will be there to help you with your specific needs . . . they'll be able to tell you what's needed, how it will work and what it will provide. They'll be backed up by a minicomputer system that will provide component and unit pricing . . . in writing. If you want specific application information, you'll get it at Cincinnati Milacron . . . in writing. Process Controls Division, Cincinnati Milacron, Lebanon, Ohio 45036.

minicomputers

CINCINNATI MILACRON

Caravan Staff

From the several offices of the vast *Computerworld* organization comes the staff that has supported and is now conducting the Computer Caravan.

This staff is composed of former show people, current industry figures and sales experts, editorial people, and the all-important registration and office personnel.

The variety in their backgrounds is too detailed for presentation here, especially since all are full-time computer-conference specialists for late Winter and early Spring 1973.

The hundreds of hours of extra work, weeks and months of travel, and the valuable experience during all this hectic activity both this year and in 1972, are all reflected in a bigger Exposition and a more comprehensive Forum program for Computer Caravan/73.

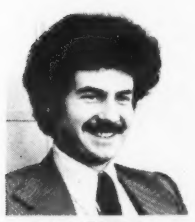
Here are the people that are making it all possible. A special message from the Publisher and Caravan President is found on page 2. Special acknowledgement goes to Leslie Flanagan, who did all this photography work; not pictured is Bob Rankin, caravan manager, who was on the road during the entire time that this section of the Caravan Supplement was being "put to bed."

Neal Wilder
exhibit sales
manager

Dottie Travis
exhibit sales
administrator

Ed Bride
forum manager

John Meade
caravan activity
coordinator


Leo Bowser
caravan manager

Edward "Ted" Bloom
registration director

Tamar Shapiro
asst. registration
director

Frani Blackler
caravan secretary

Linda Collins
caravan secretary

Beverly Butters
caravan secretary

Day 2: Panel Probes Software Sources

(Continued from S/Page 2)

III. What-if (recovery techniques)

• How to recover, in various situations. What if the system does not respond to your normal procedures?

• Examining your sources of applications and utilities, in light of expected problems (cost/performance again)

(1) Cost of failures

(2) Expertise (how to retain or keep good software people or suppliers)

(3) What have your colleagues done?

IV. Next stept?

• Your growth, and how it could affect software selection

• Impact of hardware changes on software sources

• Stability of the source (manufacturer, software house, etc.)

1974 COMPUTER CARAVAN SCHEDULE

Atlanta	February 26-28, 1974
Houston	March 5-7, 1974
Anaheim	March 20-22, 1974
San Francisco	March 26-28, 1974
St. Louis	April 3-5, 1974
Chicago	April 9-11, 1974
Cincinnati	April 16-18, 1974
New York	April 23-25, 1974
Boston	April 30–May 2, 1974
Washington, D.C.	May 7-9, 1974

Day 3: Small Systems Described by Users

(Continued from S/Page 2)

costs, etc)

• Vendor proposals (how you evaluated them)

• Procurement

(1) Problems unique to small businesses

(2) Financial peculiarities (contract flexibility, etc)

II. Operation

• Most common problems vs. chief advantages

(1) Who solves what kinds of problems, why?

(2) As a class, how does the equipment work

• New Applications

(1) Who develops, maintains

(2) Upgrades to larger configuration *vs* additional small systems

• Optional items

(1) Independent peripherals and supplies

(2) Independent software

(3) Vendor *vs* in-house training.

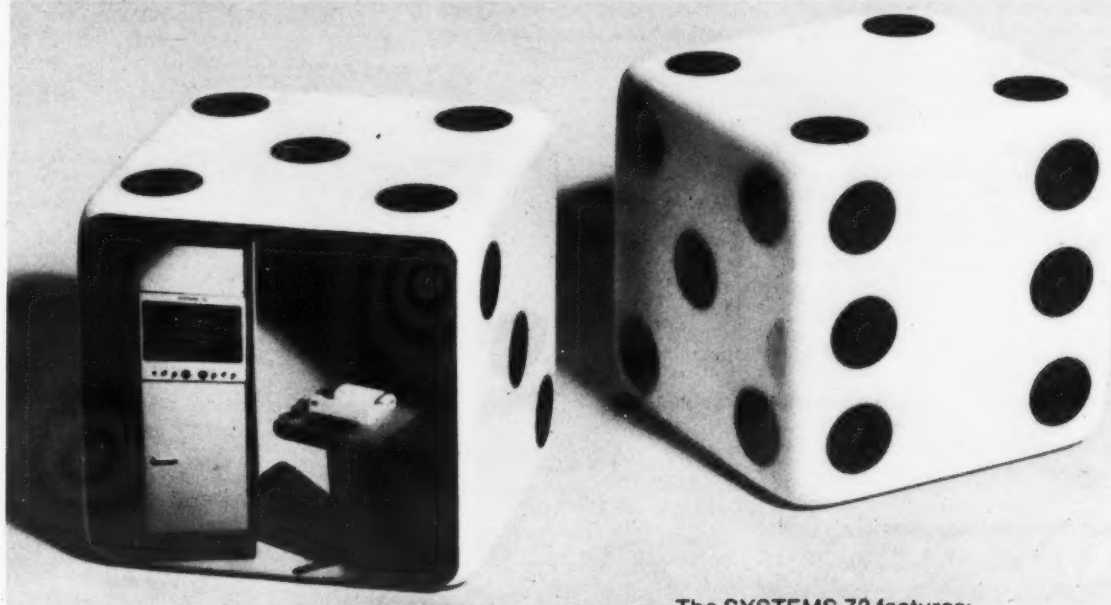
III. Review

• "What could we have changed, to make it better?"

• How does a small business look back on a computer procurement?

10% OFF THE PURCHASE PRICE* IF YOU CAN...

BEAT THE SYSTEMS



The SYSTEMS 72 computer, that is. It's programmed to shoot craps with you in our booth at the Computer Caravan, and the stakes are pretty impressive.

Like, 10% OFF THE PURCHASE PRICE OF A SYSTEMS 72 if you can run your winnings up to $1,500. We start you off with $500 "credit."

Just to keep our 72 from getting bored, we'll be running FORTRAN, BASIC, and batch on it at the same time it's shooting craps. That's only typical of the power and versatility of the 72, the first small virtual-memory computer. It combines the advanced problem-solving capabilities of much larger computers with the ease of operation and economy of minicomputers.

The SYSTEMS 72 features:
□ time-sharing □ virtual memory
□ reentrant FORTRAN/BASIC
□ multiprogramming □ all processors available to users console simultaneously.

So don't crap out. You've got plenty to gain for your company. And nothing to lose. Come on in and BEAT THE SYSTEMS.

If you can't make it to the show, write for our SYSTEMS 72 brochure, SYSTEMS Engineering Laboratories, 6901 W. Sunrise Boulevard, Fort Lauderdale, Florida 33313.

*Discount limited to one per company. Void where prohibited by law.

SYSTEMS
ENGINEERING LABORATORIES

Many Titles Suit DP Conferences

(Continued from S/Page 2)

who have invited people who they know might be interested in a certain facet of computer technology, or in certain products.

It is also a learning experience, not only in the regular Forum program, but also because of the special exhibitor seminars, where potential customers can learn about equipment capabilities and selection criteria.

So the Computer Caravan/73 is indeed many things to many people, but we don't have to stop there. Through your valuable feedback, either through Forum evaluation forms or face-to-face contact with us, we can plan the 1974 program to fill a broader spectrum of needs.

Exhibitor Listings

The following is an alphabetical listing of exhibitors in the 1973 Computer Caravan, and a brief description of the products and services to be displayed.

AMERICAN TELEPHONE & TELEGRAPH COMPANY
680 Fifth Avenue
New York, N.Y. 10019
Tel: (212) 393-2101

The visitor to the Computer Caravan/73 can see the highlights of the Bell System's approach to moving data. AT&T will feature the high-speed "dataphone 4800," first in a new family of data sets from the Bell System. The 4800 data set was designed for economical transmission at 4800 b.p.s over basic unconditioned private line facilities.

Also on display will be the Bell System's 85 A-1 Selective Calling System for polling applications. The system is a quiet, efficient way of information movement, generating management advice and systems reports in real time.

***

AMPEX COMPUTER PRODUCTS DIVISION
13031 W. Jefferson Blvd.
Marina del Rey, Calif. 90291
Tel: (213) 831-8933

Complete semiconductor, core, tape and disk system as plug-to-plug replacements for IBM 370 and 360 Computers, Univac 400 and 1100 computers and memories for DEC PDP-10 computers. Features will be the unique Ampex two-in-one TM-34 for 360 and 370 computers – two 3420 replacement tape drives in one cabinet that reduces space requirements by nearly 50%. The Ampex DS-330 disk subsystem, a plug-interchangeable replacement for either the 3330 or 3333.

Information will also be available on the complete line of Ampex mainframe memories for IBM 370/360, Univac, and DEC computers.

***

ANDERSON JACOBSON, INC.
1065 Morse Avenue
Sunnyvale, Calif. 94086
Tel: (408) 734-4030

Since its beginning in early 1967 as a manufacturer of one of the first acoustic data couplers, Anderson Jacobson, Inc. has continued to develop products for the data communications and computer terminals markets. At the present time the data communications products include a variety of 150 BAUD, 300 BAUD, 450 BAUD modems and acoustic couplers as well as a 1200 BAUD which is believed to be the only one of its kind in production today. These modems and couplers are available as stand alone units, as building blocks for a multiple modem system or as basic units for OEM applications.

The computer terminal line grew out of an early product wherein an acoustic coupler was designed to become an integral part of a teletype machine. This type of terminal with certain improvements and modifications is still in production today. In addition, an auto-answer version is the AJ841 which is based on a proprietary design that utilizes the heavy duty IBM Selectric mechanism as a printer. The third basic product of this line is a new model, the AJ630 which is a 30 character per second, non-impact printer terminal.

Anderson Jacobson maintains sales and service offices in principle cities throughout the country.

***

AUERBACH PUBLISHERS INC.
121 North Broad Street
Philadelphia, Pa. 19107
Tel: (215) 491-8212

AUERBACH Publishers is introducing its new DATA PROCESSING MANUAL during the Caravan with a special pre-publication subscription offer. This new service provides practical advice, techniques, checklists and other aids for helping DP managers solve their daily operating and managing problems. It comes in portfolio format for easy filing and reference. Also on display is the complete line of AUERBACH Computer Technology Reports, the encyclopedic standard reference for the EDP industry. These services provide all the facts, prices, performance data, configurations and technology background analysts need to make meaningful evaluations and selections of euqipment or services. Professional reference books in the fields of computer

Ampex gives you more than you asked for... again

Ampex' newest space saver...the 3420-compatible two-in-one tape subsystem for 360 and 370 computers

The biggest news since Ampex pioneered tape recording is the new two-in-one configuration for the Ampex TC-38/TM-34 tape subsystem. Now you can reduce the amount of space for tape drives and controllers in your DP center by nearly 50% ... or double the number of drives without allocating more space. You can get two high performance 3420-compatible tape drives with data rates to 200 KB, in a single cabinet only a little larger than one individually mounted tape drive. It's such a logical idea, it's amazing no one thought of it before.

But space reduction is only the beginning. The autothread on the TM-34 now is equipped with an exclusive "halo of air" that vastly improves threading without the reel-surround cartridge. The tape will literally thread itself from any position. Furthermore, the TM-34 has an automatic reel latch that forever eliminates manually operated locking levers or buttons. And, of course, this drive has a radial interface for operation with either the Ampex TC-38 or the IBM 3803 controller.

Format configurations include any combination of 9-track, single or dual density, and 7-track with data rates from 60 to 200 KB.

If you want extra value with every peripheral product, call your Ampex Computer Specialist today. He can solve your space and budget problems with disk drives and memory enhancements, too.

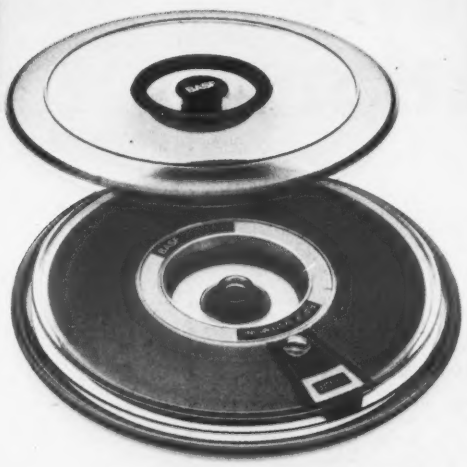
AMPEX

AMPEX COMPUTER PRODUCTS DIVISION
13031 West Jefferson Boulevard
Marina del Rey, Ca 90291, (213) 821-8933

People who think this far ahead are thinking BASF/2000A.D.

BASF/2000 A.D. The computer tape as advanced as your next idea. It's being used more and more. In aerospace technology. In advanced time-sharing operations. In university research, and business data storage. Any place where the margin for error is critical.

BASF/2000 A.D. The 100% certified 3200 fci tape that combines greater sensitivity and error-free uniformity with a thinner, less abrasive coating. The tape that actually reduces head-wear while ensuring reliability you can live with for years.



BASF/2000 A.D. If you're in the business of planning for tomorrow, or just keeping up with today, it should be part of your future.

Start thinking 2000 A.D. Talk to your BASF representative now. Or send for all the facts on our full line of magnetic media products.

BASF SYSTEMS
Division of BASF Wyandotte Corporation

Crosby Drive, Bedford, MA 01730.

BASF

BASF for people who really know.

science, data processing and management science are also on display and can be examined at your leisure.

***

BASF SYSTEMS
Crosby Drive
Bedford, Mass. 01730
Tel: (617) 271-4000

BASF Systems, the world's leading media supplier, will display its complete line of computer tapes, including the new BASF/endura, and the premium BASF/2000 A.D., as well as its full line of disk packs.

BASF's 2000 A.D. uses a new 'Hotter' oxide and a new thinner, harder coating for those applications requiring premium quality which exceeds industry standards.

BASF/endura offers computer users optimum prize/performance at low initial cost. Both tapes meet not only today's transport requirements, but future 3200 bpi – 6400 FCI expectations as well.

BASF disk packs are fully compatible with most major computer equipment.

On display will be the new 1236 (3336 compatible), the 1112 (200 tracks per inch 2316), the 'FLOPPY DISK,' and a full line of compatible disk packs.

***

BOEING COMPUTER SERVICES, INC.
P. O. Box 708
Dover, N.J. 07801
Tel: (201) 361-2121

BCS offers comprehensive support with product lines that include computer time, programming, consulting, training, data base services; applications that include general business and financial systems, scientific and engineering techniques, management and computer operating systems.

BCS operates from 24 sales offices located throughout the United States. Data Centers are maintained at Seattle, Philadelphia, Wichita, Huntsville and Washington, D.C. with over $100,000,000 worth of equipment on order to provide maximum computer flexibility.

***

CAMBRIDGE MEMORIES, INC.
969 Virginia Road
Concord, Mass. 01742
Tel: (617) 259-9880

Cambridge Memories, with headquarters in Concord, Mass. and plants in Newton, Mass. and Tijuana, Mexico is a full-line supplier of memory systems used as add-on or replacement main memories for IBM systems 360 Models 22, 30, 40, 50 and 65 as well as System 370 Models 155 and 165 computers and numerous minicomputers such as Digital Equipment's PDP-11 line and the Varian 620/i. It also manufacturers ferrite core, semi-conductor and moving magnetic domain (DOT) memory systems for use in computer processors, peripheral equipment and terminal devices.

CENTRONICS DATA COMPUTER CORPORATION
One Wall Street
Hudson, N.H. 03051
Tel: (603) 883-0111

The popular Centronics dot matrix serial impact printers feature speeds of 100 to 330 characters per second and 60 to 200 lines per minute. The recently introduced 80 column Model 306 printer, priced at $1,995, is one of the highlighted products. The low cost Centronics Model 401 CRT terminal, priced at $1,495, allows keyboard controlled data entry, editing and communications capabilities for system on-line and off-line operations. A wide variety of popular communications and computer interfaces are available to meet most system requirements.

***

CIG COMPUTER PRODUCTS, INC.
1351 Washington Blvd.
Stamford, Conn. 06902
Tel: (203) 359-2100

CIG Computer Products, Inc. markets and services computer products and systems throughout the world.

CIG 370 Package Leasing
– Flexibility
– Savings up to 60%
– Graduated growth with early terminal options CIG-Data Recall Mark II Memory
– Four component design
– Failsafe reliability
– IBM 370 Memory (Virtual Storage)
– IBM 360 (all models)
– UNIVAC CIG I/O Channels
– 360/370 Block Multiplexer Channel
– 360/370 Selector Channels
– 360/370 Multiplexer Channel CIG Disk Subsystems CIG Tape Subsystems CIG/EDOS (Extended Disk Operating System)

***

CINCINNATI MILACRON, PROCESS CONTROLS DIVISION
Lebanon, Ohio 45036
Tel: (513) 494-5486

Cincinnati Milacron, manufacturer of reliable general-purpose minicomputers, wants you to "get it in writing." Tell us your applications and we will produce a proposal within minutes.

A CIP/2200 minicomputer based system displays all the relevant information on a CRT. You select the components needed, and the CIP minicomputer system automatically produces your proposal. See this unique system in operation and get full details on the economy and reliability of minicomputers from Cincinnati Milacron.

***

COMPUTER DEVICES, INC.
9 Ray Avenue
Burlington, Mass. 01803
Tel: (617) 273-1550

Computer Devices, Inc., a TechVan Corporate Partner, manufactures the TELETERM family of low-cost time-sharing terminals and printers.

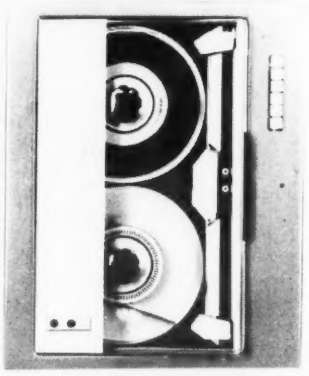
TECHTRAN

#1 in reliable High Speed Cassette Communications Terminals!

TECHTRAN INDUSTRIES

580 Jefferson Road, Rochester, N.Y. 14623 • (716) 271-7953
NEW YORK (203) 776-3816 CHICAGO (312) 671-3220
LOS ANGELES (714) 541-8518

perdata



PER DATA'S New Easy Load 1600 cpi TAPE TRANSPORT

See Me "SPIN MY REELS" At The COMPUTER CARAVAN

perdata

102 New South Road • Hicksville, N.Y. 11801 • (516) 938-2851 • TWX 510/221-1881

All TELETERMS are rugged and dependable, utilizing a thermal (non-impact) printing technique for printing. Weighing only 22 pounds and fitting under an airline seat, the CDI 1030 TELETERM is being shown at the Computer Caravan in three exciting useful, NEW models:

CDI 1030 APL – the first portable terminal for the APL user. Available in ASCII code or EBCD as a direct replacement for the popular IBM 2741 APL device.

CDI 1030/MULTICS – the first portable with a MULTICS keyboard.

CDI 1030/ACT – for a time-sharing network. Communicates with other 1030's, TTY or time-sharing computers directly.

***

COMPUTER TRANSCEIVER SYSTEM INC.
66 Midland Avenue
Paramus, N.J. 07652
Tel: (201) 261-2800

Manufacturers of EXECUPORT® high speed data terminals for remote data collection & Transmission. CTSI will demonstrate their portable, quiet 310 series; the new model 1200 with speeds to 120 CPS; the new model 625 Paper Tape Punch & Reader; and the new 420 magnetic tape memory unit for off-line collection/storage/transmission of data through cassette recording. The equipment is characterized by extreme reliability: MTBF = less than one service call per year.

***

CULLINANE CORPORATION
One Boston Place
Boston, Mass. 02108
Tel: (617) 742-8656

Cullinane Corporation will feature at The Computer Caravan its proprietary software products including those for use with data base management systems. These products are CULPRIT, IMS/CULPRIT, TOTAL/CULPRIT, RDMS/CULPRIT and user department versions including EDP-AUDITOR, PERSONNEL-EDP-REPORTER, MARKET-EDP-ANALYZER, PORTFOLIO-EDP-REPORTER and PAYOUT. In addition, a seminar on the EDP-AUDITOR/CULPRIT Systems will be held from 4 to 5 PM on the second day of each show. Participants in the seminars will be able to attend the Computer Caravan free of charge as guests of the Cullinane Corporation.

Those wishing additional information may contact the Cullinane Corporation at its booth at The Computer Caravan or calling (617) 742-8656.

***

DATA DISC, INC.
686 W. Maude Avenue
Sunnyvale, Calif. 94086
(408) 732-7330

Data Disc, Inc. will exhibit its ANAGRAPH Display System. IBM 360/370 users will see an operational system which not only offers IBM 2260 emulation but also provides truly versatile graphic display capability. OEM's will be able to see Data Disc products at work in an operating system.

ANAGRAPH provides up to 32 users with low cost TV terminals. Image storage and refresh is independent of the CPU. ANAGRAPH employs a minicomputer, TV terminals, keyboards, a Data Disc head per track disc memory, a Data Disc graphic display system and a Bright Industries IBM compatible magnetic tape drive to provide a cost effective system with grow power!

***

DATA GENERAL CORPORATION
Route 9
Southboro, Mass. 01772
Tel: (617) 485-9100

Minicomputers, peripherals, and software. (Full listing on Page S/16.)

DATAPRO RESEARCH CORP.
One Corporate Center
Route 38
Moorestown, N.J. 08057
Tel: (609) 234-4300

Datapro Research Corporation is displaying DATAPRO 70, the most widely used data processing reference service in the world. DATAPRO 70 is unique among reference services in that it provides monthly updated product reports on all important EDP hardware and software products – in one convenient three-volume set. DATAPRO 70 provides fast reports on new products to keep you up to date, plus in-depth product analyses to help you in planning EDP systems and selecting equipment. The DATAPRO 70 service also includes personalized consulting by telephone, and NEWSCOM, a monthly newsletter on significant product trends and developments.

DATA PRODUCTS CORPORATION
6219 DeSoto Avenue
Woodland Hills, Calif 91304
Tel: (213) 887-8000

LINE PRINTERS

– Medium to high speed impact printers: for OEM systems ranging from low cost minicomputers and terminals to high speed EDP systems.

– Satellite Printers: for economical off line printing. CORE MEMORY PRODUCTS.

– Memory Systems: a complete line for applications ranging from mainframe to bulk storage in commercial and military systems. Also, plug compatible replacement memories.

– Stacks: customized to your needs.

– Cores: sizes from 14- to 30-mil.

COMPUTERIZED DISTRIBUTION

If you have any questions about data communication...

Don't ask me!

Bring your questions to the Computer Caravan and ask these fellows in the ICC booth.

Matt Kenny
V.P.-Sales

Jon Blasdell
National Accts. Sales Mgr.

Smiley Hinton
Central Reg. Sales Mgr.

John Roush
Central Reg. Accts. Executive

Jim Loonam
Sales Representative

Dick Thomas
Sales Representative

Tom Hamilton
Sales Representative

Don Duke
Sales Representative

Spence Thomason
Sales Representative

Harvey Herzog
Sales Representative

Jim Switzer
Sales Representative

ICC

International Communications Corporation.
7620 N.W. 36th Avenue, Miami, Florida 33147
Telephone 305 + 691-1220 305 + 836-4550
In Europe: RACAL-MILGO LIMITED Reading, Berks, England

a milgo company

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MANAGEMENT SYSTEMS
– CODONS's: dedicated system that slashes distribution cost COMMUNICATIONS
– DataPak-Multiplexing Systems: for reducing data transmission costs.
– DETECT test set, for quickly locating network failures.

***

DECISION
5601 College Avenue
Oakland, Calif. 94618
Tel: (415) 654-8626

Decision will be showing three newly announced products and systems: the Data General NOVA compatible line of peripheral controllers, systems, a new real-time operating system, and innovative Optical Page Reader and DECISION's Optical Data Entry System.

The Model 3170 controller plugs into the NOVA line providing a minimum of 11.6 megabytes of storage from a Diablo, Caelus or Wangco 5440 top loading cartridge disk drive. Another featured peripheral is the Model 3180 phase encoded 1600 bpi tape drive controller.

A key product introduction is the DINOS family of NOVA operating systems. DINOS I, II and III are high performance, low-cost and more useful answers to Data General's RDOS.

Decision's Model OMR 6500 Optical Reader involves a new concept which scans a fixed page in contrast to the conventional approach of moving the page across the scanning device. The result is greater throughput with minimum opportunity for error. The OMR 6500 has many options, broad flexibility of input data forms and inherent design simplicity that maximizes ease of maintenance.

Decision's Optical Data Entry System evolves around the Model OMR 6500 and provides users with the first proven computer base Optical Data Entry System.

***

DELTA DATA SYSTEMS CORPORATION
Woodhaven Industrial Park
Cornwell Heights, Pa. 19020
Tel: (215) 639-9400

DELTA will exhibit a typical video display terminal system which includes a terminal with special function keyboard, a cassete recorder, and a line printer. The company will also show its DELTA 5000 video display terminal and Multi-Term programmable terminal multiplexer. These and other DELTA products offer unique features such as special character generators, upper/lower case, PAGING, built-in interfaces for computer/terminal compatibility, 3000-character memory, and others, all designed to solve difficult terminal system problems.

***

EASTMAN KODAK COMPANY
Business Systems Markets Division
343 State Street
Rochester, N.Y. 14650
Tel: (716) 724-4745

Eastman Kodak will show how KODAK KOM Microfilmers contribute to Computer Output Management. Various pieces of microfilm retrieval hardware, including the KODAK EKTALITE Reader, will be featured. Microfilm systems specialists will be available to discuss your computer output requirements and to show how computer output microfilm can provide added output flexibility to your DP shop.

***

ELECTRONIC MEMORIES & MAGNETICS
12621 Chardon
Hawthorne, Calif. 90250
Tel: (213) 644-9881

EMM MICROMEMORY Processor Storage Systems
Interfaces with System/360 and System/370 computers. Storage capacity: 16,384 to 3,145,728 bytes. Cycle time: 750 nanoseconds to 2.5 microseconds. Large card design for easy maintenance. Permits model and capacity changes in the field. Internal power module protects stored data in case of power failure.
CAELUS DISK MEDIA
CMCX DISK PACK for System/370
CMIII DISK CARTRIDGE for System/3
CMI DISK CARTRIDGE for new low cost systems
PGI 844 UNIVERSAL CONTROLLER AND DISK SYSTEM
Interfaces with System/360 and System/370 computers. Handles intermixed track densities and variety of I/O devices. Controller MTBF of 10,000 hours. 10% as large as 2314 controller. Interchangeable plug-in cards simplify maintenance. Test mode option permits off-line media verification.

***

ENTREX, INC.
168 Middlesex Tpke.
Burlington, Mass. 01803
Tel: (617) 273-0480

ENTREX, INC. the leading manufacturer of Key-to-Disk data entry equipment including a preview of new, improved software. ENTREX will demonstrate the system's extensive editing capabilities and validity checks, including crossfooting and subtotaling.

A highlight of the ENTREX Exhibit is the introduction of the new System 280, a low cost key-to-disk

13 reasons why you should go to the Computer Caravan.

iomec inc Model 2560 Reader
New high-speed reader – first 1,000 cps reader at less than $1,000.

iomec inc Iodisc Drive Model 3404
New iodisc Series 3000 top-loading disc drive – 200 tracks/inch using IBM-type 5440 cartridge. 60 msec average access time and 96 million bit capacity. Light weight and small enough to easily fit 24-inch deep standard rack.

iomec inc Model 40 Portaverter
New Portable Numeric Data Entry System for inventory accounting, order entry, stock replenishment and financial transactions. Completely self-contained with magnetic cartridge data storage.

iomec inc Model 7470 Punch/Reader
New punch/reader combination with speeds up to 70 cps punch and 400 cps read. Easy loading and chad removal with no need to slide unit out from panel.

iomec inc Iodisc Drive Model 31
New iodisc Series One includes fixed and removable disc for combination of inexpensive removable media system with mass storage add-on capability.

iomec inc Model 202 Printer
New line printer – varied font sets and multi-font buffer automatically adjust to speeds of 142, 202, 256 and 526 lines per minute. Highest quality printing on 6-part – or more – forms.

iomec inc Model 2016 Reader
New low-cost reader – 150 cps asynchronous. Lensless optical system. Single moving part.

iomec inc Model 4040 Reader/Handler
New reader/handler combination – field-proven 2540 in one integrated unit with servo-controlled handler. Electrical noise has been eliminated.

iomec inc Iotape Controller Model 9100
New plug-in Controller for low-cost Series Ten magnetic tape transport handles both 800 cpi NRZI and 1600 cpi formatters at the same time. Each formatter controls up to 4 tape drives.

iomec inc Model 170 Punch
New 70 cps punch–motor driven interposer for positive perforating. Echo read-after-write check-back optional. Easy front panel loading. Adjusts to paper width automatically.

iomec inc Iotape Controller Model 101
New Series Three Controller card mounted Cartritape drive for plug-in directly inside your minicomputer. Provides extremely large capacity, slow-speed ROM. Ideal compact program loader.

iomec inc Iotape Transport Model 313
New iotape Series Three triple (Model 313), dual (Model 312) and single (Model 311) Cartritape drive-pacs. Large capacity magnetic tape cartridge for reel-to-reel performance.

iomec inc Model 2032 Reader
New medium-speed reader – single moving part, 300 cps asynchronous and 400 cps synchronous. Lensless optical system.

The new iomates. See them all in
Anaheim–Mar. 27-29. San Francisco–Apr. 3-5.
Kansas City–Apr. 11-13. Chicago–Apr. 17-19. Cleveland–Apr. 24-26.

Our systems are going to town.

It's time for another dynamic Caravan showing. This year, we're featuring a multi-terminal, on-line data entry system in a multi-task environment. The extremely flexible, 630 nsec, multi-bus V 73 is on your track. Commanding an order entry program running under our VORTEX operating executive with print-out in hard copy on our super-versatile STATOS 31® printer/plotter. And just about every bell and whistle of modern technology. A total systems capability that solves a broad range of complex systems applications problems. Faster. And with more efficiency and flexibility than anything else you'll see around.

V73 with VORTEX

You'll view a real-time operating system at its best. CRT's operating independently of each other simultaneously, show the multi-tasking capability with foreground tasks in a real-time environment. Note that VORTEX has automatic checkpoint/restart and dynamic memory allocation for most efficient usage. After you've seen the flexibility of VORTEX in action and our new V73 doing its fast and powerful stuff, you'll wonder why it doesn't cost more. Especially when you consider its multiple path interfacing between processors and memories and I/O's.

STATOS

Here's where you'll get your hands on the results of your order entry program. You'll see the immediate output from two or more tasks—each of which outputs data direct to the STATOS 31. Fast. A capability of printing upper and lower case characters at up to 1,000 lines per minute. With definition that really pops right out at you. Without degrading the performance of the overall system. Let your imagination run wild. Enter any order you can think of in any quantity for up to ten different items. When you finish placing your order, you'll see an instant print-out on the STATOS 31 printer/plotter—complete even to the shipping label.

ADAPTS

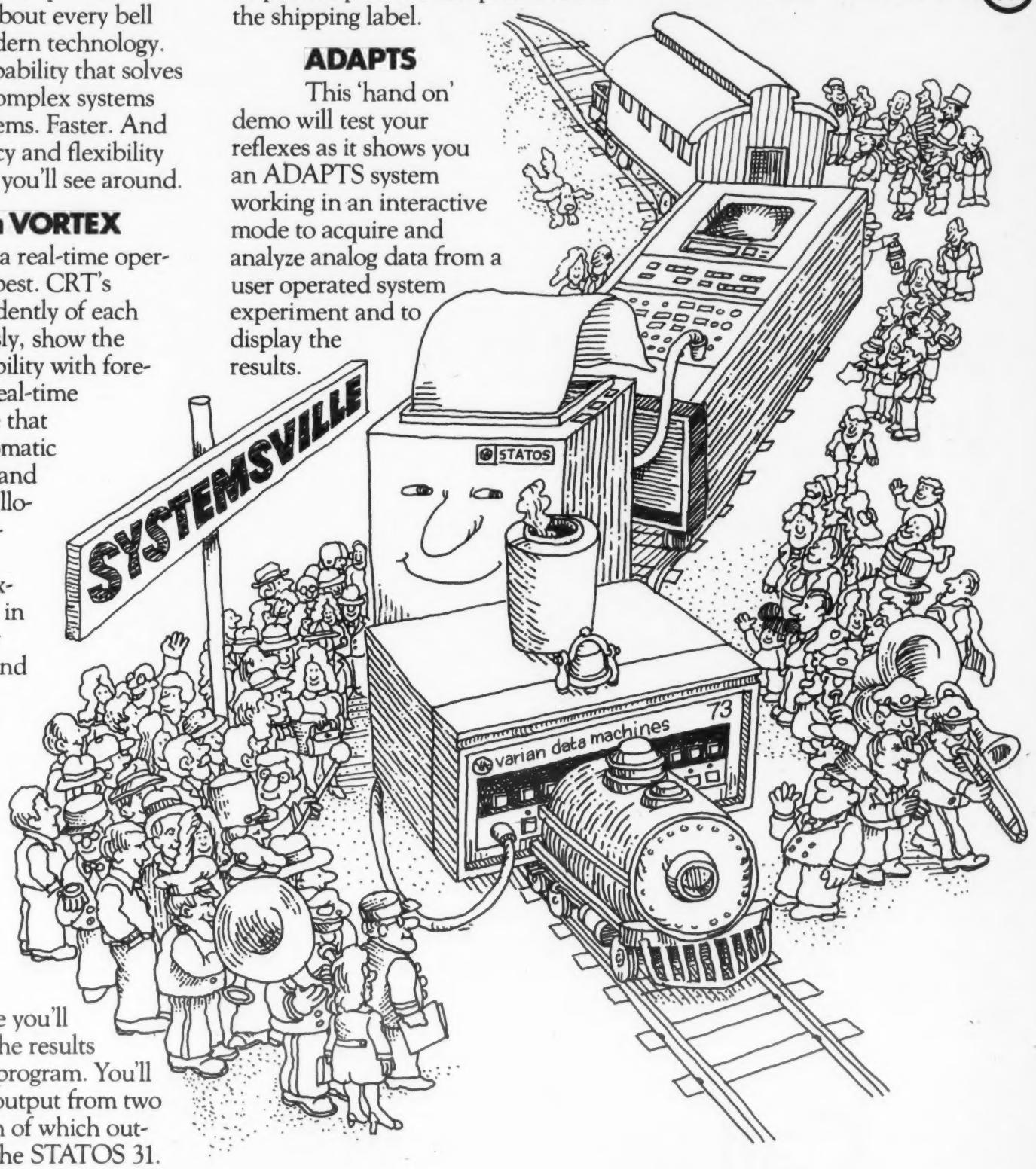
This 'hand on' demo will test your reflexes as it shows you an ADAPTS system working in an interactive mode to acquire and analyze analog data from a user operated system experiment and to display the results.

Bells, lights and buzzers will test your reflexes and stimulate your thinking about our systems capabilities.

Get into our system. Go to town with us.

Varian Data Machines,
2722 Michelson Drive, Irvine,
California 92664 (714) 833-2400

varian data machines



system for the user of less than ten keypunches. System 280 offers most of the features of the larger System 480, plus a unique communications option.

***

GENERAL COMPUTER SYSTEMS, INC.
P.O. Box 6251
Dallas, Texas 75222
Tel: (214) 242-8411

The GCS 2100 multimedia data entry system provides Interactive Data Editing At Source *(IDEAS®)*.

Featured with GCS 2100 will be turnaround document processing and work processing.

THREE YPES OF INPUT will be demonstrated: punched cards, the standard 029 keyboard for data entry, and the typewriter keyboard for word processing.

FOUR TYPES OF OUTPUT will also be operational: magnetic tape, teletype, sixty line per minute supervisor station, & high speed printer for letter writing.

The GCS 2100 with 29 million characters of data storage, provides CRT formatting with GCS's unique *PROMPTING®* for both data entry and word processing.

. . . the data editing company with *IDEAS®*.

***

HAZELTINE CORPORATION
Pulaski Road
Greenlawn, N.Y. 11740
Tel: (516) 549-8800

Hazeltine Corporation, Greelawn, New York, will exhibit the Hazeltine 2000 teletype compatible video display terminal, dual magnetic tape cassette unit and hard copy printer. The Hazeltine 2000 is used either as a stand alone remote terminal which can operate at variable speeds up to 9600 BPS, or as an off-line data entry device in conjunction with the magnetic tape cassette unit. Several editing features as well as dual intensity video for protected format display provide a powerful system for data preparation, entry and retrieval.

***

HEWLETT-PACKARD COMPANY
11000 Wolfe Road
Cupertino, Calif. 95014
Tel: (408) 257-7000

Hewlett-Packard's display includes the remarkable new HP-80 shirt-pocket calculator. Brother to the very successful, engineering-oriented HP-35 calculator, the HP-80 is designed to serve the needs of the business and financial community.

A demonstration of low-cost batch processing with HP's thoroughly modern mini is one of the features of the 2120 DOS-M system, while multiprogramming capability is documented in a variety of commercial, scientific and engineering appliations.

OEM product displays include the micro-programmable HP 2100 minicomputer, HP-7900 moving-head discs and 7970 digital magnetic tape units.

***

INCOTERM CORPORATION
6 Strathmore Road
Natick, Mass. 01760
Tel: (617) 655-6100

INCOTERM Corporation is displaying its new low-cost SPD 900 series Remote Batch Terminals. The series 900 offers compatibility with IBM 2780 and 3780, Univac 1004, CDC User 200, 360/20 HASP and ICL 7020.

The key element of the series 900 is the famous INCOTERM 10/20 Stored Program Display and electronic keyboard. Three models offer a choice of line printers from 200 to 400 lines per minute and card readers from 150 to 300 cards per minute.

***

INFOREX, INC.
21 North Avenue
Burlington, Mass. 01803
Tel: (617) 272-6470

INFOREX will exhibit its 1302 Intelligent Key Entry System and highlight its new KeyScan and In-Line Data Entry Systems. The 1302 Intelligent Key Entry System features all keypunch, key-verify, and key-to-tape functions as standard, plus many new key-to-disc capabilities in a system with proven performance and reliability. KeyScan, for the processing of turnaround documents and check remittances, offers a unique combination of OCR, Automatic Check Processing and operator keyboard intervention within an integrated system designed to reduce the number of steps and personnel, thereby lowering the cost per document processed. The new In-Line Data Entry System is designed to meet the users' specific data preparation needs by offering a wide array of editing checks assuring immediate error detection and correction. These range from simple table look-ups to field, record, document and group integrity tests.

***

INFOTRON SYSTEMS CORPORATION
7300 N. Crescent Blvd.
Pennsauken, N.J. 08110
Tel: (609) 665-3864

Infotron Systems Corporation will exhibit their latest time division multiplexer (TDM) and front end equipments, the Timeline 240 and Timeline 450.

The Timeline 240, an ultra reliable TDM, accomodates all available terminal types, codes and speeds – both asynchronous and synchronous – from 37.5 to 4800

If you write application software, we can match it with systems.

Why stop at selling or leasing software systems to end users? Now you can offer them complete minicomputer package systems.

This way they'll be able to get everything they need from you. And you'll be able to get everything you need from us.

Wider choice of peripherals We offer a full line of peripherals to go with our SUE and MAC minicomputers: IBM compatible 5440 disks, CRT/keyboards, printers from 100 cps to 600 lpm, magnetic tapes, cassettes, punched card devices and paper tapes. Anything your customer needs. And when his needs change, so can the system. Easily. Even by factors of 2 or 3.

Complete software tools To make your programming burden lighter we offer a full set of software tools: Fortran, assemblers, utilities, RTOS, sort/merge, DOS and RPG/SUE. That last item is 98% compatible with RPG II by the way.

And we're the only company we know of that unconditionally warrants all our software for a full year.

Maintenance too We'll handle any and all problems your customers might have, promptly and expertly, anywhere. (We recently solved a problem in Bangkok, for instance.) And we'll do it by contract or on call, either way you want it.

We also offer training classes in maintenance as well as in programming.

Add it up So what you'll have is a more salable package to offer an end user. Everything he'll ever want or need in a minicomputer system, right down to the enclosures. (Which we'll put your name on, if you wish.)

Everything ready and working from the minute it's wheeled in his door.

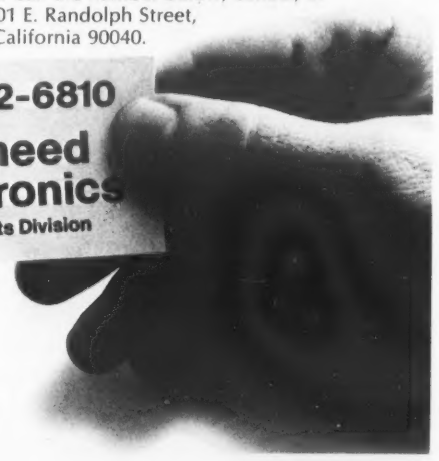
YOUR NAME

And you'll be dealing with an established, reputable company. One that will be there when you need us.

Let's talk. Call the number below, collect, or write us at 6201 E. Randolph Street, Los Angeles, California 90040.

213/722-6810

Lockheed Electronics
Data Products Division



Call us.

Boston 861-1880 • New York metro (201) 947-8107 • Philadelphia 825-2880
Washington (703) 525-3600 • Atlanta 266-0730 • Detroit 577-5037 • Chicago 833-4600
Dallas 231-6163 • Houston 682-2617 • San Francisco (408) 257-3357

baud. Features include critical component redundancy, full system diagnostics, automatic baud rate detection, dynamic overspeed protection.

The Timeline 450 Port Selector extends a computer's traffic handling capability. Front end ports are assigned to communications channels on a hynamic rather than dedicated basis, allowing fewer ports to service more lines. Maximum capacity is 254 lines by 124 ports.

***

INTERDATA, INC.
2 Crescent Place
Oceanport, N.J. 07757
Tel: (201) 229-4040

Interdata will display several members of its New Series of minicomputers. This upward compatible family of processors covers the complete range of the price/performance spectrum. Members of the family include: the Models 70, 74 and 80 for general purpose use and the Models 50 and 55 for Data Communications. Interdata will also display its full range of software Operating Systems: a Real Time Telecommunications Operating System, a Real Time Operating System, a Basic Operating System and a Disc Operating System. Each afternoon during the show, Interdata will present a meaningful seminar on either "Microprogramming," "Data Communications," or "Operating Systems Software."

***

INTERNATIONAL COMMUNICATIONS CORPORATION
A Milgo Company
7620 N.W. 36th Avenue
Miami, Fla. 33147
Tel: (305) 691-1220

ICC/MILGO will display a complete line of data communication products, featuring high-speed modems for data transmission over dial-up phone lines or leased data lines. Modems from ICC operate at data rates from 2400 bits-per-second to 9600 bits-per-second. The ICC display will also include data communication test equipment and accessories. Experienced personnel will be in attendance for consultation.

***

IOMEC INC.
Route 9
Southboro, Mass. 01772
Tel: (617) 481-2500

IOMEC, one of the largest independent OEM suppliers of minicomputer peripherals and data entry terminal equipment announces 13 new product additions at the 1973 Computer Caravan.

The new products include:

– Five brand new paper tape products – featuring the first 1000 cps reader for less than $1000 and the 70 cps punch/400 cps reader combination.

– An entirely new series of disc drives including new mass storage (36 megabits) add-on dsic memory for the Series One "floppy" disc system.

– Plus Model 200 multi-font buffer line printer; varied packages of the IOTAPE Series Three minicartridge deck and the Series Ten large tape transports.

– One of the most advanced portable data entry equipment systems in the market today. The system uses micro-logic circuits to provide an extensive range of features at the lowest price.

***

ITT DATA EQUIPMENT & SYSTEMS DIVISION
East Union Avenue
East Rutherford, N.J. 07073
Tel: (201) 935-3900

The ITT 3501 Asciscope is a low-cost, TTY compatible CRT display terminal complete with keyboard, acoustic coupler, integral modem, buffer, and printer interface – no extra costs. The Asciscope can communicate terminal-to-computer or terminal-to-terminal. It features interfaces for a Data Access Arrangement when using its integral 300 bps modem, for external modems of 1200 or 2400 bits per second, and for printers operating up to 120 characters per second. The Asciscope leases for $65.00 a month, including maintenance. Nationwide installation and service by ITT includes on-the-spot exchange if a leased unit should ever require service.

***

LOCKHEED ELECTRONICS COMPANY, INC.
Data Products Division
6201 E. Randolph St.
Los Angeles, Calif. 90040
Tel: (213) 722-6810

The SUE minicomputer data processing system for small business applications will be demonstrated by the Data Products Division. System flexibility provides for memory expansion to 64K bytes, up to four 5440 type disk drives, high performance printers, magnetic tape, and card equipment. Comparable to IBM System 3/model 6, the CRT oriented SUE system is of particular interest to application software organizations who wish to market a turnkey total package for small business applications. Manufacturer supplied software includes RPG II, a disk operating system, and sort/merge, as well as assemblers and utilities.

Also displayed are memory modules of the MM-365, a replacement memory for the IBM 360 model 65 and up.

***

Penril is not the largest manufacturer of high speed modems in the world.

But we will be.

Penril
Data Communications, Inc.
5520 Randolph Road
Rockville, Maryland 20852
301/881-8151

Regional offices:
Atlanta, Boston, Chicago, Houston, Los Angeles and New York

Penril's 4800B-1 modem pictured above has been selected by the U.S. Internal Revenue Service for use in its nationwide data communications network.

MODULAR COMPUTER SYSTEMS, INC.
1650 West McNab Road
Ft. Lauderdale, Fla. 33309
Tel: (305) 974-1380

The MODCOMP MAX III real-time multiprogramming operating system will be demonstrated. Foreground tasks will be initiated and executed. Assemblies and FORTRAN compilations will be performed as background operations. A MODCOMP II/25 computer with 32K words of 16-bit, 800 nanosecond memory will be used for the demonstrations. System peripherals will consist of disc, card reader, two CRT's, paper tape reader, and keyboard/printer. Analog, digital and communications interfaces will also be displayed.

While at the MODCOMP booth, guests may register to win a MODCOMP II computer with 16K words of memory. This computer will be awarded at the end of the Caravan's ten-city tour.

***

PARADYNE CORPORATION
8550 Ulmerton Road
Largo, Fla.
Tel: (301) 654-0033

Paradyne Corporation will display: The BISYNC-48 super modem featuring the highest throughput available on dial-up lines – plus, guaranteed error-free transmission; our 4800 bps, automatically-equalized M-48 modem with really usable self-test features; the BISYNC Analyzer – the unique test instrument that provides immediate fault isolation in BSC communications links; and the revolutionary remote I/O and computing systems that eliminates conventional communications hardware, terminals, modems and software – Paradyne's astonishing PIX.

Sales and Services offices in Largo, Florida (headquarters); and San Francisco; Los Angeles; Atlanta; Chicago; Boston; Detroit; St. Louis; New York City; and San Antonio.

***

PENRIL DATA COMMUNICATIONS, INC.
5520 Randolph Road
Rockville, Md. 20852
Tel: (301) 881-8151

A complete line of data modems operating from 300 bps to 4800 bps for leased line and DDD data transmission. End user, OEM and custom designed configurations will be displayed. Also, specially designed telephone line test and analyzing equipment will be demonstrated.

PER DATA CORPORATION
102 New South Road
Hicksville, N.Y. 11801
Tel: (516) 938-2851

Digital Tape Transport –
7 or 9 track; read after right or read only, 25 to 75 IPS. 200, 556, 800 & 1600 CPI densities. IBM compatible. Fixed head disk drive fast head per track random access storage. Storage capacities up to 1 million 16 bit words. Average access time - 8.5 ms. Non-contact head loading.

Moving Head Disk Drive – Front load or top load. Storage capacity up to 100 million bits at density of 200 track. Access time – 38 ms.

Controllers & Formatters – for tape transport, moving head disk, fixed head disk and printer. Fully self contained including power supply and cabling.

***

PRIME COMPUTER, INC.
17 Strathmore Road
Natick, Mass. 01760
Tel: (617) 655-6999

The Computer Caravan is PRIME Computer's first major public demonstration of its recently announced PRIME 200 small computer. Featuring a unique (software first) design – all systems software was completely specified before the computer's hardware was designed – the system will be used to demonstrate an extremely powerful disc operating system. PRIME's DOS-200 features extensive file management resources, batch processing system, numerous disc file access discipline, and file system common to all PRIME software.

***

SANDERS DATA SYSTEMS
Daniel Webster Highway
Nashua, N.H. 03068
Tel: (603) 885-4211

Sanders to feature intelligent terminal system with disk during Caravan.

Sanders Data Systems, Inc. will exhibit and demonstrate both their 804 stand alone and 810 cluster display terminal systems using standard software packages for order processing, billing, inventory control, data entry, remote job entry, and other business applications during the Computer Caravan.

The 810 system features a disk memory which can provide up to 5 million bytes of storage, while the 804 system interfaces a tape cassette transport for applications needing smaller storage capabilities. Both systems will be seen in operation with 32 character per second and 200 line per minute printers, and a card reader.

***

SIERRA RESEARCH CORPORATION
47 Middlesex Tpke.
Burlington, Mass. 01803
Tel: (617) 273-0900

Vermont Research

Bits or Bytes for minimum Bucks

Whether it is disc or drum – whether it is head per track or moving head – whether it is digital interface or complete memory system, you should call us at Vermont Research to review your requirements for rotating memories.

Head Per Track
Drums
Series 3000

VRC Model	Million Bits	OEM Quan Price
3002-32	2	$ 3150
3002-64	4	$ 3500
3002-128	8	$ 4620
3016-128	8	$ 4865
3016-256	16	$ 8365
3016-384	24	$11165
3016-512	32	$13265

Moving Head
Disks
Series 5000

VRC Model	Mega Bytes	OEM Quan Price
5016	40	$ 5400
5018	62	$ 6300

Vermont Research Corporation
Precision Park
North Springfield
Vermont 05150
Telephone: 802-886-2256
Telex: 710-363-6533

VRC Inc.
5261 West Imperial Hwy
Los Angeles
California 90045
Telephone: 213-641-7100

Vermont Research Limited
Cleeve Road
Leatherhead
Surrey
Tel: Leatherhead 74758
Telex: 23280

It's time your computer got its hands dirty. Sierra Research Data Systems Division will demonstrate the capabilities of the SDA-770 Data Collection System to collect, inquire, retrieve and display manufacturing data. Typical inventory, material flow and labor distribution control programs will be demonstrated with the Sierra Operating System and FDC (Factory Data Collection) programs. Remote data collection will be demonstrated twice daily via on-line communications between a real-time SDA-701 Remote Terminal and SDA-710 Attendance Station at the Computer Caravan and a Sierra SDA-770 Central Controller at our plant in Boston, Massachusetts.

***

SYCOR, INC.
100 Phoenix Drive
Ann Arbor, Mich. 48104
Tel' (313) 971-0900

Sycor will exhibit its popular Model 340 Intelligent Communications Terminal in two configurations – branch office order entry and remote job entry. The branch office terminal will demonstrate Sycor's unique dual communications feature – low speed (110-300 baud) asynchronous communications compatible with major time sharing systems and high speed (1200-4800 baud) binary synchronous communications. The remote job entry configuration features a 200 lpm printer, a 250 cpm card reader, and is compatible with computers operating under HASP or ASP control. Both configurations are user programmable with Sycor's T.A.L. (Terminal Applications Language).

***

SYSTEMS ENGINEERING LABORATORIES, INC.
6901 West Sunrise Blvd.
Ft. Lauderdale, Fla. 33313
Tel: (305) 587-2900, ext. 544

Systems Engineering Laboratories will display the power and versatility of their SYSTEMS 72 computer. It will be running FORTRAN, BASIC and Batch at the same time it is shooting craps with booth visitors.

- SYSTEMS 72, the first small, virtual-memory computer, combines the advanced problem-solving capabilities of much larger computers with the easy operation and economy of minicomputers.

It features: time-sharing - virtual memory - reentrant FORTRAN/BASIC - multiprogramming - all processors available to users console simultaneously.

- SYSTEMS will also show a film on EDITS (Engineering Documentation Interactive Terminal System), a new system for faster, more economical preparation of engineering drawings.

***

TALLY CORPORATION
8301 South 180th Street
Kent, Washington 98031
Tel: (206) 251-5500

Tally Corporation will feature the Datascribe – the total data entry, communication print out system plus the new Tally line printer – the most cost effective choice for intermediate speed printing applications.

The Datascribe Communicator with its unique data compression feature eliminates transmittal of redundant information which reduces telephone line time up to two-thirds. Transmission speeds range from 80 to 420 records-minute depending on the modem used and the amount of data compression available.

Data on magnetic tape can be printed at up to 200 lines per minute on the new Tally printer. The patterned CROSS-POINT® printing technique results in unpresidented reliability and consistent high quality multiple copy at low cost per page.

TECHTRAN INDUSTRIES, INC.
580 Jefferson Road
Rochester, N.Y. 14623
Tel: (716) 271-7953

Cássette Communications Terminals, EIA RS232 and TTY Compatible featuring single and dual decks, switch selectable speeds to 2400 baud, High Speed Search, FULL Remote Control, Data Edit, Switch Selectable On-line/Off-line operation; models for both ASCII and IBM 2741 operations.

***

TEKTRONIX, INC.
P. O. Box 500
Beaverton, Ore. 97005
Tel: (503) 644-0161

Tektronix shows new APL graphic terminal.

The 4013, Tektronix's new APL terminal will be shown at the Computer Caravan. The company will also show the 4912 Digital Cassette Tape Unit and 4610 Hard Copy Unit. APL provides an extremely flexible language for computer graphics. Tektronix has implemented a group of functions to exploit the advantages of APL as a programming language for graphics.

The 4013 is a member of the 4010 family of computer display terminals. Pricing and delivery information is available at the booth.

***

TELETYPE CORPORATION
5555 Touhy Avenue
Skokie, Ill. 60076
Tel: (312) 982-3134

Teletype Corporation is exhibiting their model 38 wide platen terminal

When you visit
the MODCOMP exhibit, you can register to win a MODCOMP II computer with 16K words of 800 nanosecond memory. Contest rules and entry blanks are available at the MODCOMP booth.

While visiting us, you will see a MODCOMP II system with disc, CRT's and other peripherals operating under our MAX III Real-Time Executive. Real-time tasks will be scheduled, initiated and executed while FORTRAN compilations and assemblies are performed at a checkpointable, lower priority level in the background.

Come see a *real* real-time executive in action at the MODCOMP booth!

Meet the MODCOMP Computer Family

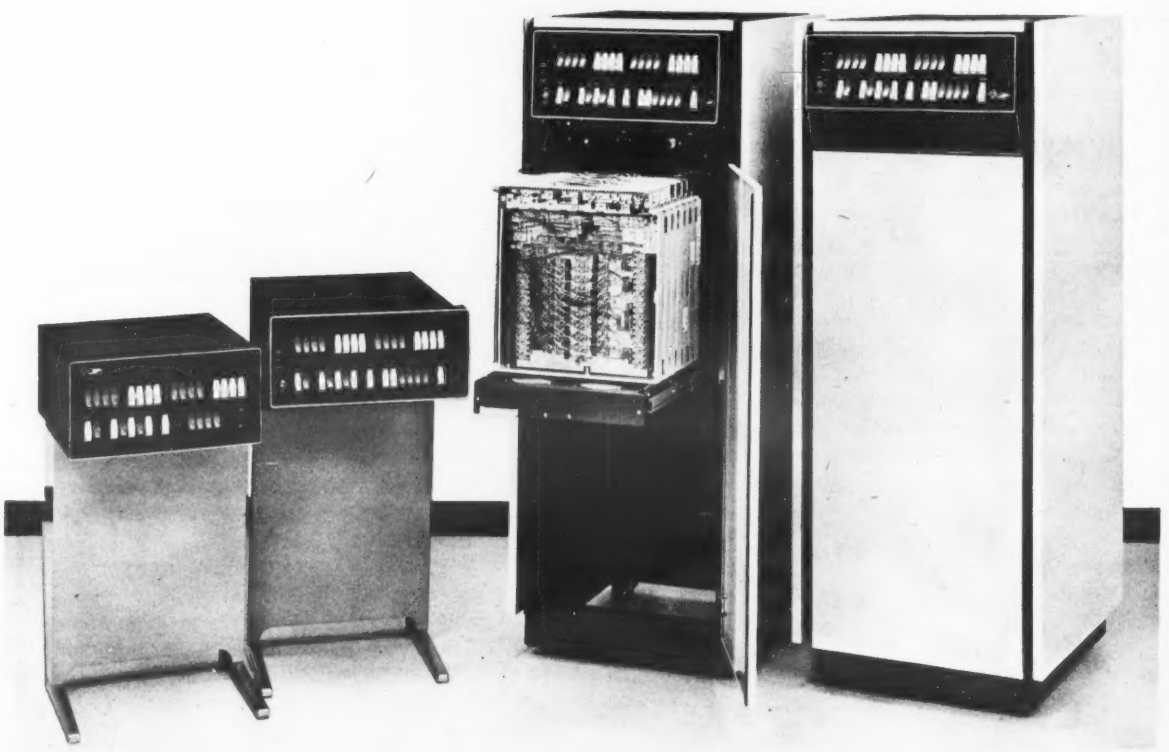
at the Caravan

See one...
Run one...
Buy one...

WIN ONE!

modular computer systems

1650 W. McNab Road
Fort Lauderdale, Florida 33309
Phone (305) 974-1380



and the Teletype® 4210 magnetic tape data terminal featuring the automatic rewind and local printout option. When combined as a remote-computing terminal arrangement, you transmit and receive online at speeds up to 240 characters per second, and then print out data at lower local speeds, all on an unattended basis. The model 38 terminal prints a full 132 character line at 10 characters per inch in upper and lower case, and accepts standard 14-7/8" fan-fold paper. Total price for both terminals is less than $4,000.

***

TEXAS INSTRUMENTS INC.
P. O. Box 1444
Houston, Texas 77001
Tel: (713) 494-5115, Ext. 2165

"Silent 700*" Electronic Data Terminals and minicomputers will be demonstrated and displayed by TI personnel. The new, low-cost "Silent 700" ASR teletypewriter with twin magnetic tape cassettes will be demonstrated, as will the popular Model 725 Portable Data Terminal. Two 16-bit minicomputers will be on display; the Model 960A "Bit-Pusher*" computer, and the Model 980A high-performance general purpose computer. Both computers have fast semiconductor memory and many standard and built-in features for more cost-effective computer applications.

*Trademarks of Texas Instruments Inc.

***

VARIAN DATA MACHINES
2722 Michelson Drive
Irvine, Calif. 92664
Tel: (714) 833-2400

Varian Data Machines demonstrates broad systems capability along with some new products. ADAPTS, Varian's laboratory automation system built around Extended BASIC, will be demonstrated on a 620/L-100 computer. Also on display are VDM's new V73 medium-scale computer and the STATOS 31 electrostatic printer/plotter. These items along with other peripherals, are tied together in one system under control of the VORTEX real-time operating system software. Both laboratory and business-oriented applications will be demonstrated.

***

VERMONT RESEARCH CORPORATION
Precision Park
S. Springfield, Vt. 05150
Tel: (802) 886-2256

The Model 5016 Disk Memory provides 40 megabytes of data storage on one fixed disk, and one removable disk in a top loading 5440 type cartridge (with a 3336 type disk). Technology breakthroughs in proprietary track following and magnetic head design allow conservative track densities of 666 tracks per inch with equally conservative track bit densities of 4100 bits per inch nominal. Access time for this advanced moving head disk is 28 msec average, 60 msec maximum. 3600 RPM operation provides a low 8.33 msec average rotational latency and a fast 6.9 megabit serial data rate. The slide and mounted unit includes an integral DC power supply in its 10 3/8 inches of 19-inch RETMA rack. Also available with the micro-programmed, error-correcting Model 8100 "Intelligent" controller which can serve up to eight disk units.

The Model 3002 Drum Memory is the newest of VRC's dependable head-per-track drums. Data capacity is 9 megabits on 128 tracks. Reliable TBM data recording at 2200 bits per inch allows 4096 16-bit words per track formatted in 128 sectors. 3600 RPM operation gives you true 8.7 average access. A dust-tight enclosure and an automatic head actuation mechanism continue the proven VRC reliability. Mounting slides, DC power systems and distinctive front panel are standard. So is the single connector TTL interface. Available with either the Model 3100 sector-buffered controller or the Model 3400 two-word buffer controller. The Model 3008 is a big brother with up to four times the data capacity.

***

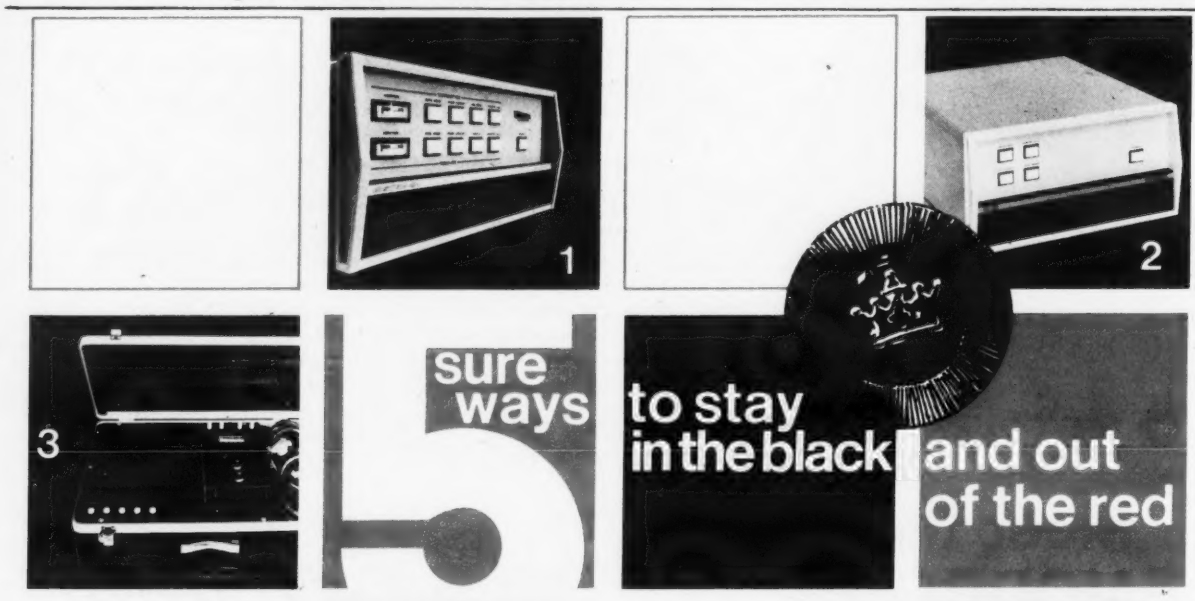
WESTERN UNION DATA SERVICES COMPANY
16 McKee Drive
Mahwah, N.J. 07430
Tel: (201) 529-1170

Western Union Data Services Company will show side by side the 30 character-per-second EDT 300 AST Teleprinter with its paper tape buffer and its EDT 300 Magnetic Send-Receive, a terminal with integrated magnetic tape buffering capability for remote batch and time-share applications.

***

DATA GENERAL CORP.
Route 9
Southboro, Mass. 01772
Tel: (617) 485-9100

Data General Corporation, the number two minicomputer manufacturer in the world, will display its minicomputers, peripherals, and software. A system built around a powerful Nova 800 Jumbo will demonstrate a Real-Time Disc Operating System, Timesharing BASIC, and the new Fortran 5 on a variety of terminal devices. Data General's minicomputers are used for all types of applications, including computation, communications and control/instrumentation.



See how Paradyne can help turn your data communications links into assets instead of liabilities. You can't afford to miss seeing these five proven time and money savers when Computer Caravan '73 comes to your city!

1. The BISYNC-48 super modem featuring the highest throughput available on dial-up lines – plus, guaranteed error- free transmission.
2. Our 4800 bps, automatically equalized M-48 modem with really useable self-test features.
3. The BISYNC Analyzer – the unique test instrument that provides immediate fault isolation in BSC communications links.
4. Our revolutionary remote I/O and computing system that eliminates conventional communications hardware, terminals, modems, and software – Paradyne's astonishing PIX.
5. Service that keeps your links up and running.

Discover for yourself how Paradyne products and service maximize performance and reliability of your data links within a cost/benefit context that makes good business sense.

It's your move now!

Just in case you happen to miss us at the Caravan, contact your local Paradyne office for complete details:

Paradyne Corporation
799 Roosevelt Road
Building 4
Glen Ellyn, Ill. 60137
312/858-6310

paradyne

Paradyne Corporation 8550 Ulmerton Road Largo, Florida 33540 813/536-4771

Bits & Pieces

MDS 360/370 Disk System Comparable to IBM 3330

UTICA, N.Y. – Mohawk Data Sciences Corp. now has a 3330-type disk storage subsystem.

The MDS 8830-I accommodates up to eight disk drives, and the 8830-2, up to 16.

Both models can be used with the System 370 and the System 360/65 and above. The 8330 disk drive offers a storage capacity of 100 million bytes with a 404 cylinder pack.

The 8830 disk drive utilizes the IBM 3336 disk pack or equivalent and has an average random access time of 27 msec.

The monthly rental of the MDS 8830 is $500 under a one-year lease with unlimited maintenance, and the purchase price is $19,400. The 8830-I disk controller is $1,795/mo or $69,900, while the 8830-2 is $1,890/mo and $74,000.

The firm is at Box 362, 13503.

Enlarger/Printer Unit Offered

NORTH BERGEN, N.J. – Trans World Technology, Inc. offers an enlarger/printer unit designed for automatic, programmed, multiple-copy printback from microfiche.

Known as the "Three/Four," the unit will be marketed exclusively in the U.S. by Trans World Technology.

With capacity rated at 500 print/hr, the printer produces a complete set of prints from a 60-frame fiche in six minutes.

Cost per copy is .02 cents for 8.5 in. by 11-in. and .04 cents for 11 in. by 17-in. size. Cost of the unit is $14,500 and delivery is 10 weeks from 4100 West Side Ave., 07047.

Data Acquisition Systems Shown

CORNWELLS HEIGHTS, Pa. – B & F Instruments, Inc. offers a new generation of Digital Data Acquisition Systems based on the SY256 System.

New options include a coupler for read/write magnetic tape with off-line tape dump to printer.

The new basic controller costs $7,500. Depending on system complexity, delivery is 60 days to six months.

Codabar Receives Line Printer

STAMFORD, Conn. – Pitney Bowes has a computer line-printer system for the high-speed printing of Omnidirectional Codabar, the machine-readable black and white bar code used to automate sales ring-up and checkout operations.

Designed for supermarket and grocery operation, the system enables grocers, wholesalers or food manufacturers to print machine and human-readable labels.

Termed the "Monarch 2000 Codabar Encoding System," it comprises a magnetic tape reader, a controller with programmable logic and a high-speed printer.

The firm is at 69 Walnut St., 06904.

Configuration vs. Performance

Minicomputer Trade-Offs Are Changing

By Michael Weinstein
Of the CW Staff

Many minicomputer buyers make the mistake of pricing systems by comparing hardware configurations. With the advent of solid-state technology they would be better advised to forget the configuration and concern themselves with which system provides the best computing service.

Pricing by configuration was valid in the late sixties when most minicomputers used similar concepts in design, processed only one program at a time and required little initial programming.

A late sixties' user had only to analyze his needs and compare various systems on the basis of price versus computer power – e.g., memory size, cycle time, etc.

Hard to Evaluate

The move to solid state and other new technologies in the last few years has changed design and capabilities among computers so much that it is no longer possible to evaluate systems as easily.

In the race to provide users with minicomputers costing less and computing more, manufacturers have tried completely different techniques so there now is little similarity in architecture from machine to machine.

Further, not only is hardware different but so is software. Each new design offered to the user must incorporate unique software and operating systems.

With no industry standards the modern mini buyer can buy poor hardware with poor software, poor hardware with good software, good hardware with good software and good hardware with poor software, and in each case have the same system configuration.

Analysis: Yesterday and Today

Potential users must now consider what the system can do and not how it is configured. They must analyze hardware capabilities – not to be confused with size, cost of peripherals and their capabilities and programming costs.

Look at the Instruction Set

More important than the memory size offered is how efficiently it handles the mini's instruction set. Even in simple applications one minicomputer can take twice the number of words to execute a program as another.

One indication of the efficiency of the instruction set is to compare the memory required for similar operating or software modules.

For example, if the user intends to program in Fortran or Basic, he should compare the memory required for the Fortran compiler or the Basic interpreter. This memory size ration gives a good indication of the memory required for other applications.

In a multiprogramming environment one should compare the memory needed for real-time operating systems. Users must be careful in such a comparison as some operating systems are much more powerful than others and some minicomputer users employ disk subsystems.

In Doubt? Benchmark

No matter how complicated the hardware design there is no need to get bogged down in technical discussions. If you are in doubt, benchmark; if not in doubt, still benchmark. Write a program and run it on different machines to see the amount of memory required. No salesman, technical representative or technical discussion can argue against a poor result.

Only after one has determined CPU efficiency should he consider internal speed. Most minicomputer buyers do not have the need for superfast cycle times.

The time needed to execute a program is the product of the number of execution cycles used and the time required for each cycle.

Minicomputers are coming with increasingly faster execution times by incorporating fast memory – e.g., semiconductor – and/or a complex CPU that achieves more data manipulations during each cycle.

Given the choice of equal processing times for a benchmarked program, it is best to choose the machine with complex CPU since it tends to indicate a more efficient use of instructions, and fast memory can be added at a later time more cheaply than a fast CPU.

Honeywell Offers Cassette System For Use With Minicomputer Line

By Ken Shonk
Of the CW Staff

WELLESLEY, Mass. – Honeywell has introduced its first cassette tape system. The 5400 Cassette Subsystem is designed for use with the System 700 minicomputers and will provide an alternative to the paper tape data and program storage mode previously used.

Each cassette can store up to 600,000 characters of information, with 300,000 characters on each of the two parallel tracks. Phase-encoded at a recording density of 800 bit/in., characters of data can be transferred at an average rate of 700 char./sec.

The unit consists of a control unit and a rack-mountable assembly that includes one or two cassette tape handlers and the power supply.

Two techniques of error checking are used during both read and write operations. One detects missing transitions and sets an error status bit. The other checks whether the total number of bits read in a record is a multiple of eight and sets an access error status bit.

Monthly rental for the 5400 with a controller and one handler is $124 on a five-year lease and the purchase price is $4,075. With two handlers the subsystem rents for $172 and sells for $5,000. The subsystem will be available in the third quarter of 1973.

Singer Programmable Calculator Comes With Software Library

SAN LEANDRO, Calif. – Singer Business Machines has a programmable calculator supported by a program library for specific user applications.

The 1155 operates on internally stored programs – up to 511 machine instructions. The calculator contains 20 memory registers and two working registers. Each register holds 13 digits with two digit exponent, decimal point and sign.

Program editing is through an "expansion edit feature" which allows users to open and close a program to accommodate changes at any specified point and proceed to the next step without having to reenter the program after interruption. Conditional, unconditional and indirect branching are also features.

The 1155 includes the Model 511 magnetic card reader/recorder which can store programs for entry to the programmable calculator.

A check digit is automatically calculated for each program and may be printed to identify and verify card loading accuracy. Each card holds two 511-step programs.

Available applications programs include: circuit analysis for electrical engineers, compass headings or fuel consumption rates for airline navigators, and amortization rates for banks.

The keys are grouped into three color-coded sectors: arithmetic function, data entry and register control, and programming and machine control.

The 1155 programmable calculator with the 511 magnetic card reader/recorder costs $2,595. The firm is at 2350 Washington Ave., 94577.

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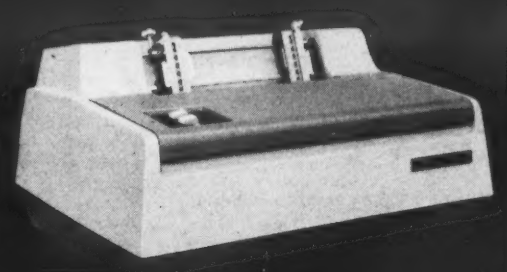

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Vendor Support, Not Hardware Ability, Brings Bank Into Honeywell Account

By James P. Roarty
Special to Computerworld

BROOKLYN, N.Y. – If one accepts the premise that a data processing system is supposed to help run the business better, then hardware is only a small part of the effort that can be advanced by the vendor.

Thus, when the Metropolitan Savings Bank decided to modernize computer operations, the main criterion was to find a source that offered total support, even after the equipment was installed.

Consultant Helps

In 1971, this modernization process began – the bank had previously been running an IBM 1401 for a number of years. The bank solicited bids from vendors and worked with an outside consultant to select the vendor and system that would best suit needs geared to expansion of the bank (now allowed by changes in New York's banking laws).

The competition was between a Honeywell 1015, an IBM 370/135, a Burroughs 3500 and a Univac 9400. Honeywell was chosen not for hardware capability, but for the support the bank was promised from Honeywell. In January 1972, the bank ordered dual 2060s. The first (batch) system was installed in June 1972 and the second (on-line) system went in in September 1972.

From the outset of the purchase cycle, it was decided to develop an on-line banking package free from restrictions inherent in vendor-supplied, off-the-shelf packages.

Honeywell offered to help construct the package – in return for allowing Honeywell to offer the package to other banking customers. (Honeywell also helped convert about 175 IBM 1401 programs to the 2060s).

The operations officers of the bank sat down with the DP staff and the Honeywell people for six months and this group hammered out exactly what it wanted the package to do.

Its goal was simply to eliminate all back-office paperwork – to go on-line with all transactions that occur in a branch office and to provide, again on-line, the bank's management with the needed information.

Of a total of eight professionals now developing the package, six are from Honeywell. So far they have implemented the club accounts portion of the package and are about to go on-line with the savings portion.

Honeywell's hardware has performed flawlessly, except for a short in one of the cables under our flooring; and there were very few bugs in the OS/2000 operating system. One area of concern was the company's ability to provide satisfactory field maintenance, but so far fears have been allayed.

The present configuration consists of two Honeywell 2060 central processors with 131K of main memory, an 1100 line printer for the batch system, one tape drive for each system, a card reader and a punch for the batch system and 420M characters of disk storage. The system is tied to Honeywell 278 disk drives and Honeywell 286 communications controllers.

The bank plans to move to 277 disks and the Datanet 2000 front-end processors, but would like to see someone else's experience on this equipment before moving to it. All equipment, except the disks and communications controllers, are purchased.

In branch offices, Financial Data Systems, Inc. minicomputers and terminals and CRTs have been installed. The minis are advantageous because their own memory and buffer characteristics allow the system to add terminals or tape cassettes, etc. without any alterations in the main Honeywell systems.

Roarty is senior vice-president for Metropolitan Savings Bank in Brooklyn.

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PDP-8, DCC112 Get 80M-Bit Tape Storage

SYOSSET, N.Y. – Lamb Laboratories is offering an 80M-bit expandable magnetic-tape storage for both the DEC PDP-8 and the Digital Computer Controls, Inc. DCC112.

Designed to replace punch card or punch tape for either program or file storage, the magnetic storage is on 10.5-in. reels using quarter-inch tape costing one cent for 50K bits.

The complete system costs $2,490 and includes a rack-mountable tape-transport; an interface with read/write circuitry, transport-control logic and integral power supplies; and a basic tape-handling software and interconnecting cables.

The 36-lb transport can be mounted on a 19-in. rack. The 8-lb interface is 19 in. by 8-3/4 in. The $850 expander or mainframe weighs 5 lbs and is 19 in. by 8-3/4 in. Additional transports are available for $1,075, including expander-card and cables. The firm is at 155 Michael Drive, 11791.

New OEM Products

(While equipment in this column is primarily for Original Equipment Manufacturers (OEMs), in most cases it is also available in single units to interested users.

Further, while much of this equipment is not presently available as such to the end user, it does give some indication of techniques and products that may be incorporated into end-user equipment.)

Reader Interfaces TTL Logic; Star-Wheel Reader Shown

HACKENSACK, N.J. – The Model 4300R 300 char./sec photoelectric tape reader is available from Data Peripheral, Inc.

The unit – complete with spooling features and LED "opto-hybrid" system – will interface TTL logic.

The spooling utilizes dancer arms which are sensed optically. The spooler can operate bidirectionally at speeds up to 60 in./sec.

Unit price is $750, OEM price is $580-100-unit lot.

The firm also unveiled a medium-speed star-wheel paper tape reader.

The Model 4150 sensing 8-channel reader features gold contacts, and is intended for use in environments not suitable for photoelectric readers.

The unit operates bidirectionally using a step motor at speeds up to 150 char./sec.

Unit price is $425, with the OEM tag set at $340 in 100-unit lots from 14 Porter St., 07601.

Tape Reader Lacks Electronics

SANTA ANA, Calif. – "Everything necessary for punched-tape reading is supplied by the EECO TRH9300 except reader electronics," according to a spokesman for Electronic Engineering Co.

The unit is designed for an OEM who can include reader electronics in his main electronic package.

Depending on circuitry, reading speed can be up to 800 char./sec.

Price is $249 in single-unit trial quantity from 1441 E. Chestnut Ave., 92701.

Novas Get CRT Display

WALTHAM, Mass. – Lexicon, Inc. is offering a CRT display and keyboard control for Nova minicomputers.

The Lexiscope 2000 alphanumeric display is packaged on a single Nova-style printed circuit card. It features a 2000-character MOS-RAM memory organized to give an 80-column by 25 row format. The Lexiscope 2000 also includes a complete keyboard control at no extra cost.

Operation of the display and keyboard control does not require the use of teletypewriter interface.

The display board costs $1,585, with quantity discounts available from 60 Turner St.

Panel Meters Offer MOS-LSI

WESTLAKE VILLAGE, Calif. – A line of digital panel meters combining custom MOS-LSI and "Field Effect" liquid crystal displays is available from Tekelec, Inc.

The TA Series includes 2-1/2, 3-1/2 and 4-1/2 digit displays with resolution up to .005%, 10 reading/sec., 10 μsec response time and normal mode rejection of 40 db without an input filter.

The 39 models in the TA 300 Series, starting at $47 each in quantities of 100, incorporate plug-in range modules, common-mode noise rejection, optional fully isolated parallel BCD output, bipolar operation and a shielded transformer power supply requiring less than 1.5W.

Options include four ac power options and five Vdc power, low-power reflective display, input filter, screw terminal I/O connections and rear panel mounting. The firm is at 31829 W. La Tienda Drive, 91361.

Univac Sets Series 60 Operations To Support New EMR User Base

BLUE BELL, Pa. – Univac has set up a Series 60 Operations to support its newly acquired base of over 150 computers manufactured by EMR Computer.

Included in the base are customers with real-time special applications in fields such as geophysical DP, lab automation, communications systems, telemetry and industrial control, according to Julian V. Bilski, director of Series 60 Operations.

In acquiring EMR Computer, Univac also gained the maintenance and lease contracts to over 150 computers, EMR's complete factory and field inventory, all documentation for reproduction of hardware and software, and all patents, trademarks and licenses for EMR Computer products, including those under development," he observed.

New users moving to Univac include several major oil companies which use Series 60 computers for processing seismic data, five states with Series 60 law enforcement systems, and several large industrial corporations using the computers for specialized production control.

Full customer engineering and marketing support activities are available at the former EMR facility in Minneapolis; Series 60 management headquarters is here.

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Firm Solves Its Overcapacity Problem As Lessor, Lessee; Saves $6,000/Mo

By Sasha Yasinin
CW Hawaii Correspondent

HONOLULU – Computing Management, Inc., a local-based computer services firm, recently reported a turnaround to profitable operations and credits "80% of the turnaround" to downgrading its IBM mainframe, Terry Brooks, CMI marketing consultant, told *Computerworld.*

CMI, a subsidiary of Crown Corp., had purchased one of IBM's first 370/145s for $670,000. "The machine had far more capacity than we needed. We would probably have been better off with a 135 but none was available when we placed our order," Brooks explained.

William T. Treadwell, CMI president brought on board last June to get CMI running in the black, leased out CMI's 370 to Hawaii Medical Service Association (HMSA) which was looking for expanded mainframe capabilities on a three-year lease.

CMI then leased an IBM 360/40 from Boothe Computer Corp. for its own use.

The computer switch saved CMI about $6,000/mo, officials said.

The three-year HMSA lease leaves the door open to the possibility of CMI's using the 370 itself if it needs that much capacity when the lease is up, Brooks said.

Its overcapacity problem solved, CMI's future financial prospects are brightened by a new hotel-management-reservations system which became operational in mid-February.

The hotel system, scheduled to go into operation in some 15 hotels here during the next three months, takes reservations over a hotel-based on-line CRT terminal, prints confirmation slips, registration cards, agency commission checks, deposit accounting and other reports.

CMI hopes to expand its marketing activities for this system to the Continental U.S., possibly through franchises to other computing firms, Brooks said.

About 70% of CMI's income comes from its hotel system and other repetitive computing tasks, with the rest coming from contract programming and systems development work.

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Modeling Technique May Curb Pollution

LA JOLLA, Calif. – A computer modeling technique called Explor may help control the effects of undesirable emissions from automobiles.

The model, developed by Systems, Science and Software, Inc. under a contract from the Environmental Protection Agency, uses a Univac 1108 to predict where pollutants will go, where they will concentrate and in what amounts, and how long they are likely to remain. Actual amounts of emitted pollutants, topography of the surrounding area, temperature and wind forces are all taken into account.

Explor can be used to predict what type of land development is most acceptable near freeways; the difference in pollution levels between stop-and-go driving and high-speed driving; and how pollutant levels would differ with different freeway designs.

New Zealand Sets Up DP Center

Special to Computerworld

WELLINGTON, New Zealand – The government has approved the establishment by the New Zealand State Services Commission of a $7 million engineering and scientific computer center.

The center will process a wide range of engineering and scientific work for government departments and will be operated by the Ministry of Works as agent for the State Services Commission.

The equipment for the center includes an IBM 370/168 which will replace the existing 360/40 and will be located in Wellington.

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Step by Step

Mini Makes Experiments Move Ahead

AUSTIN, Texas – When chemical engineering students do complex experiments at the University of Texas here a minicomputer helps them determine the validity of the data they get from one part of the experiment before they go on to the next part.

In a computer-based experiment, a student logs in on a Data General Nova, and is shown a series of slides that explains the experiment and the equipment used in it. Another group of slides reviews the theory of the experiment, and asks him questions related to it.

If he answers incorrectly, the correct answer is given in an attempt to help the student understand the system. The dialogue continues until the student understands the theory behind the first step.

When the experiment is ready, the student types in a command, and the mini begins monitoring data and transmitting it to two larger computers. Another 35mm slide tells him what to expect at this stage of the experiment, and by typing in a command, the student can compare the data from his experiment against a norm. If they agree, he can go on to the next part of the experiment; if they do not agree, he can repeat the procedure.

"In addition to its instructional value, the system contributes to laboratory safety," Dr. Eugene H. Wissler, professor of chemical engineering, said. "Critical variables can be monitored for experiments that involve some hazard, and the experiment can be terminated automatically whenever a potentially dangerous situation develops."

The University of Texas uses a Nova computer with 8K words of core memory, a 12-channel multiplexer, a dual magnetic tape cassette unit and a graphic terminal and teletypewriter for manual input and output.

Scottish Firefighters Get Complete Building Data

GLASGOW, Scotland – This city plans to link its fire engines with a computer to fight blazes more efficiently.

Small facsimile printers installed in the cabs of 40 fire engines will receive by radio and print out detailed information on floor plans of the burning building and its known fire hazards while the firefighters are on their way to battle the blaze.

George Cooper, Glasgow's firemaster, said the mini-based system is believed to be the most advanced firefighting system of its kind in the world. He said his crews "will both be better equipped to tackle the job and their safety better protected."

The system, based on two Honeywell 316 computers due to be installed in June or July, will ultimately contain data on 10,000 properties. The information, to be updated daily, would include building plans and layouts, known hazardous materials in the building, and a special file of 1,000 hazardous substances and how to handle them in the case of fire.

Glasgow intends later to link 400 fire alarm boxes directly to the computer. When an alarm is signaled, the computer would dispatch the nearest fire crew directly, without any human intervention.

Firm's Electric Meters Calibrated With Minis

LAFAYETTE, Ind. – Duncan Electric Co., manufacturer of watthour meters that measure electricity consumption, uses three minicomputers to calibrate its meters.

In the calibrating operation, two Data General Novas are programmed to select electrical test load parameters; transfer test data into core memory; calculate required adjustments based on the test data and stored constants; and, through use of calculated adjustments, control automatic adjustment hardware.

The minis also apply calibration accuracy limits to each meter, and determine the status of each meter – calibrate, rerun or reject – for each system cycle.

The third computer is used for program development and for backup for the two on-line computers.

Swedish Meatballs May Taste Much Better

STOCKHOLM, Sweden – A computer is responsible for having impregnated large numbers of Swedish cows since 1968.

Lantbruksdata AB (Farming Data Ltd.) provides computer technology for Swedish farmers. One application is artificial insemination, whereby Farming Data processes relevant facts and figures about a farmer's cows to generate a selection of suitable bulls for breeding. The system makes possible a guaranteed improvement in livestock quality.

In addition, DP is used for forage control by regulating feed mixes and dosages for optimum milk yields throughout the year.

Farmers can also get DP help with bookkeeping and paperwork routines in their dealings with organizations and the authorities.

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Our April 25th Supplement

Data Communications

Probably no part of Electronic Data Processing systems requires such extensive planning as a communications network. Usually two to three years is required to make sure the resulting system is successful. And if the planning is inadequate, the results can be disastrous.

Computerworld's communications specialist, Ron Frank, takes a close look at this very complicated area in our April 25 supplement. It will include information on how to go about configuring a data communications network that will solve your particular problems. We'll describe some successful communications networks and discuss the utility of various kinds of equipment. When we put it all together, you'll have an excellent overview of this increasingly important EDP tool.

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RCA

Better Training in Tech Writing Urged

HOUSTON – "Documentation is the weakest link in most programming shops," according to Dr. Bobby Waldron, director of the computation center at Lamar University.

Speaking at an installation management session at the Computer Caravan/73 here, Waldron said, "We are able to judge and manage programming teams, but it is different from conventional management."

Agreeing with Waldron, Frank Mabry said "we should demand better training in technical writing."

Mabry, a systems programmer at Baylor College of Medicine, said the most important part of what the programmer has done depends on "adequate technical communications."

The best programming output at his installation often comes from student programmers who work for about $2/hr, Waldron said. "It is the best $2 we spend anywhere. Our only problem is to keep them from doing too much."

Walt Walters, a consultant, took issue with university curricula because they do not "adequately prepare programmers for commercial applications."

The technical qualities of DP personnel are often overemphasized with too little attention given to personal characteristics that produce "superior results," he said.

Some News...Briefly

Student Picks Number, School Wins a Mini

BERKELEY HEIGHTS, N.J. – Governor Livingston Regional High School has received a free "Edusystem-5" minicomputerized educational system from Digital Equipment Corp.

The minicomputer with associated peripheral equipment was top prize in a recent contest won by 12-year-old David Rosenthal, a junior high school student. He correctly tallied the number of times the word, number or Roman numeral "eight" appeared on a contest poster designed by DEC to promote the company's PDP-8 family of minicomputers.

As the contest winner, Rosenthal could designate which school would receive the system. He chose Governor Livingston Regional High School, which he will attend next year.

The Edusystem-5 package consists of a PDP-8/F minicomputer with 4K words of memory, console terminal, education software and training credit for one faculty member.

Grant Aids Study Of Justice Systems

PITTSBURGH – A $147,000 grant for a three-year international study of criminal justice systems has been awarded to Carnegie-Mellon University by the Ford Foundation.

The research project, titled "Criminal Justice Systems – Planning Methodology and Cross-National Comparisons," will test several hypotheses about the administration of criminal justice in different nations by using a planning tool known as the Justice System Interactive Model (Jussim). The computer program developed by Dr. Alfred Blumstein, director of the University's urban systems institute and head of the project, allows criminal justice administrators to test the effect of a single change on the whole system; for example, the effect that a variation in the arrest rate might have on court workloads, detention population and probation officer requirements.

Law Printing Speeded

DENVER – The State of Colorado has installed a computerized type-composition system in an effort to save time and eliminate clerical errors in the publication of the state's session laws.

The new system should also result in a substantial savings to taxpayers over a period of years, according to James C. Wilson Jr., revisor of statutes and director of the Colorado Legislative Drafting Office.

The system, developed by Data Retrieval Corp. of America, Milwaukee, was used this year in the composing process for the 800-page *Session Laws of Colorado 1972*. The state will also use the system for the publication of the revised statutes in 1973, and future supplements to the statutes.

System to Cut Paper

WASHINGTON, D.C. – A new computer-based system that might eventually take some of the paperwork out of international trade will be tested here soon.

The system, under development for over a year, uses computer systems and uniform commodity and other transportation codes to replace the paper documents now needed for a U.S. business to do business abroad.

The system will be built around two computers – one here in the Department of Transportation and the other in the UK – which will communicate trade information directly, thus eliminating the delays associated with the paperwork procedures between the two countries.

Seating Improved

NEW YORK – A minicomputer is saving Air France approximately $35,000 annually, according to a spokesman for the airline, by reducing the time needed for passenger check-in and eliminating overboarding and redundant seat assignments.

The minicomputer is part of the Multiflight Boarding Pass System developed by General Computing Equipment Corp. of Garland, Texas.

Each agent has a display console which shows specific seat status, allowing the agent to assign seats and issue boarding passes automatically.

Coast Erosion Foreseen

CORVALLIS, Ore. – Thirty-five years after a jetty was constructed at Bay Ocean, a small Oregon resort town, the altered erosion patterns caused the town to be washed into the ocean.

According to Dr. Paul D. Komar, assistant professor of oceanography at Oregon State University, disasters like the 1952 Bay Ocean eradication can now be predicted by computer and perhaps avoided.

Komar has developed a computerized system to estimate sand movement along beach and harbor areas, showing where the coastline will increase due to sand buildouts and where it will erode.

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IEEE to Examine Software Reliability

NEW YORK – The IEEE Symposium on Computer Software Reliability, April 30-May 2, is designed to examine the topic from a combined practical and theoretical viewpoint.

The nonconcurrent sessions at the Americana Hotel here will cover introductory discussions, software testing, modeling and analysis, management techniques and programming methodology.

Each session consists of technical papers as well as a panel on a related subject.

"What is Software Reliability and Quality Assurance, Anyway?" is the theme of Monday morning's panel in the introductory session. Papers will examine large real-time control software systems, distributed systems and virtual machine techniques for improving system reliability.

Software Testing

The session on software testing features papers on optimal software test planning through automated network analysis, design and construction of an automated software evaluation system and a user's experience with Automated Code Evaluation System (Aces).

Modeling and analysis will be examined Tuesday, with panel sessions titled "What's a Bug and Who Says You Can Count Them?" and "Can a Hardware Reliability Man Find a Home in Software?"

Topics of papers range from discussing operational testing and software reliability estimation during program development to the software error effects analysis: a qualitative design tool.

"What Can Management Do Besides Holler If It's Late, and Try to Hire Smart Programmers?" is the theme for the Wednesday panel on management techniques.

Societies/ User Groups

The session on programming methodology will examine programming style, structured programming techniques, ultrareliable programming and an interface system for improving reliability of software systems.

Preregistration before April 21 costs $45 for IEEE members and $55 for nonmembers. After that date, the price is $50 and $60, respectively. The fee for IEEE student members is $8.

Information is available from Registration Chairman, Software Reliability, Box 171, Old Bethpage, N.Y. 11804.

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36 NCC Sessions Treat Cost Effectiveness

NEW YORK – The cost-effective use of computers will be examined in the 36 sessions on DP methods and applications at the National Computer Conference June 4-8.

"With computers and associated DP manpower representing an increasing portion of corporate budgets, our program will focus on the cost-effective utilization of computer power and the latest techniques and applications which hold promise for improved performance on a day-to-day basis," noted methods and applications chairman Robert W. Bemer.

Paying Its Way

"The key is making sure that the computer more than pays its way. To meet this goal, sessions are designed to take a pragmatic view of each topic under discussion and to promote maximum dialogue with the audience," he said.

The installation management part of the program will consist of 12 sessions covering performance evaluation and measurement, software products, in-house training and economics of remote terminals. Other sessions will be on confidentiality and security, data integrity and the "law of computers."

Several sessions will focus on performance evaluation.

Sessions on DP in government include computers in the elective process, urban services, the State and local scene and computers in the Congress.

ASIS Meeting to Discuss 'Forecast' for Data Service

BLOOMINGTON, Minn. – "Forecast for Information Service" will be the theme of the Second Mid-Year Conference of the American Society for Information Science (Asis), April 26-27, at the Sheraton Motor Inn here.

The colloquium will survey the state-of-the-art, research and educational implications for library/information systems specialists.

Further information is available from Jack King, Library, Hamline University, St. Paul, 55101.

Cunningham Fills ACM Post

NEW YORK – Joseph F. Cunningham has been appointed executive director of the Association for Computing Machinery.

He was formerly chief of the ADP Management Branch of the Office of Management and Budget and was responsible for the coordination of the Federal Government ADP effort.

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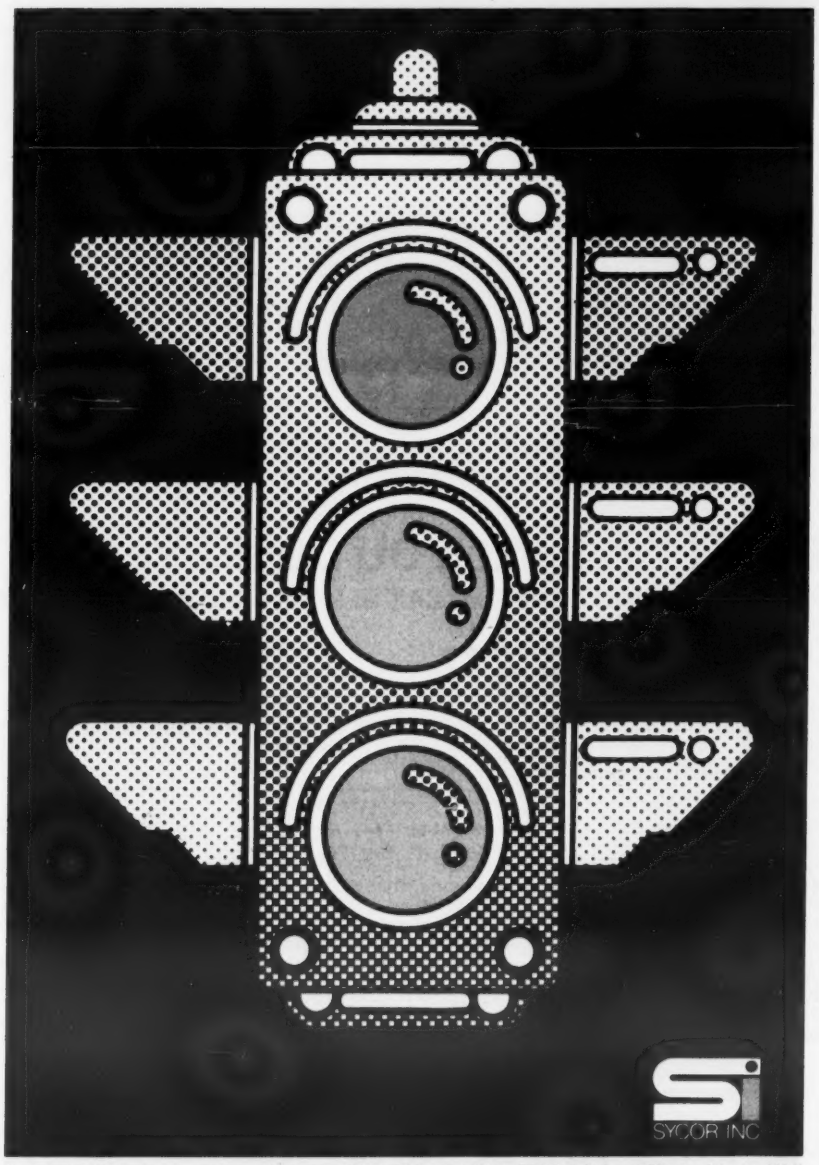

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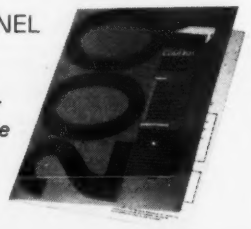

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AMA Course on DP Management Looks 'at Whole DP Picture'

NEW YORK – The American Management Association is sponsoring a three-day course on DP management here April 25-27.

Designed to "look at the whole DP picture," the course will examine such topics as planning DP utilization, motivation and the role of the top DP executive.

Staff Productivity

The session on managing and controlling data processing operations will discuss measuring productivity of operations staff, determining efficiency of equipment usage, use of outside experts and user chargeback.

Other sessions investigate how to cure an ailing DP department as well as advances in technology and their effect on DP management.

The course costs $300 for AMA members, and $345 for nonmembers. The association is at 135 W. 50th St., 10020.

Computers in the Arts Symposium Theme for Artists, Musicians

YPSILANTI, Mich. – Artists, musicians and computer fans will have a chance to gather and demonstrate their skills using computers in the arts at a workshop here April 30 – May 4 at Eastern Michigan University.

In the area of music composition, participants will be divided into those with music composition experience and those artists interested in sound production by computer.

Visual art workshops will feature sessions led by Ken Knowlton, Bell Labs, using the Explor graphics language, and Alan Sutcliffe from International Computers Ltd.

On May 5-6, a "Symposium on the Computer in the Arts" at the Cranbrook Academy of Art Galleries, Bloomfield Hills, Mich., papers will treat topics on music, visual art, literature, dance and architecture.

The final symposium event is a computer-choreographed dance written by Jeanne Beaman and performed by the Eastern Michigan University Advanced Performing Group.

Admission to the workshop series is $75 before April 20, and $11 for the symposium. After April 20, the rates are $85 and $13.

For information contact Kurt F. Lauckner, Mathematics Department, Eastern Michigan University, 48197.

Tektronix Users Unite

BEAVERTON, Ore. – The organization of a Tektronix Information Display Products users' group is underway.

The primary purpose of the users' group is to provide a central point for exchange of information among the users of Tektronix products. The group will also provide opportunities for users to meet on a national and regional basis.

Those interested in such a group should contact Jon A. Meads, cochairman Tektronix IDP Users' Group Committee, P.O. Box 500, 97005.

Moving Up

- Dr. A.S. Hoagland, of IBM's Systems Development Laboratory, has been reelected president of the IEEE Computer Society.

Albert L. Hopkins Jr., Department of Aeronautics and Astronautics, MIT, was named first vice-president.

Second Vice-President is Dick B. Simmons, director of Texas A&M University's data processing center.

- Robert L. Ashenhurst has been appointed editor-in-chief of *Communications of the ACM*. He is also editor of the *ACM Monograph* series.

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CI Notes

CDC, Romania Launch Firm

NEW YORK – Control Data Corp. and the Romanian Ministry of Machine Tools and Electrotechnique have created a joint venture firm to manufacture peripheral equipment in Bucharest.

Products will include card readers, punches and a printer used in terminals, CDC said. In addition, it is expected that the new firm will engage in R&D activity to enhance products and develop new ones, a spokesman said.

CDC will own a 45% interest, with a unit of the Ministry of Machine Tools and Electrotechnique holding 55%. CDC will contribute technology valued at $1.8 million.

Data Products Licenses Hungarians

WOODLAND HILLS, Calif. – Data Products Corp. has received government approval to issue a license for the manufacture of printers to Videoton Corp. of Hungary.

Initially, Data Products will ship complete Model 2310 and 2410 line printers for use in Videoton's 1010 mini, the firm said. Later, Data Products will ship components, and ultimately Videoton will manufacture some mechanical elements.

No Jury at Telex Trial

TULSA, Okla. – Attorneys for IBM and Telex Corp. agreed recently to a non-jury trial in the antitrust case filed by Telex. The trial date is April 16.

Xerox to Be Absent From NCC

EL SEGUNDO, Calif. – Xerox will not be exhibiting at the National Computer Conference, June 4-8, in New York.

Apparently the firm could not advance its production schedule to have a 530 system ready for the exhibit.

GE-Fairchild Pact Off

PHOENIX – General Electric Co. and Fairchild Camera and Instruments Corp. have terminated talks on the proposed manufacturing takeover by Fairchild of the GE-PAC and GE-TAC lines [CW, April 4].

"Subsequently, more detailed discussions between GE and Fairchild and discussions with customers have led to the conclusion that, contrary to the original belief, customer needs would not necessarily be served by a joint Fairchild and GE process computer company," a GE spokesman said.

Supershorts

Eastman Kodak Co. has agreed to market ICP, Inc.'s microfilm reader/printer.

– – –

Mohawk Data Sciences Corp. shipped its 1,000th System 2400 to Firestone Tire and Rubber Co., which now has more than 60 systems on rent or on order.

State of the Industry—Part I, Domestic

U.S. Shipments Could Grow 70% by '76

By E. Drake Lundell Jr.
Of the CW Staff

MONTVALE, N.J. – Shipments of U.S. computer-related equipment manufacturers to the U.S. user market will grow by 70% to 80% in the period between 1971 and 1976, according to a "consensus" of the four largest research firms in the business.

Afips Studies Market

To help overcome some of the problems caused by the differences of opinion on the size of the DP market, the American Federation of Information Processing Societies (Afips) last year held a symposium with the major organizations in the business to try to find a consensus on the marketplace.

The results of that symposium were recently published in a pamphlet on "The State of the Computer Industry in the U.S."

This is the first of a two-part series on the report.

That consensus was obtained at a workshop sponsored by the American Federation of Information Processing Societies (Afips) last year in which Auerbach Associates, Inc., International Data Corp., Arthur D. Little, Inc. and Quantum Science Corp. participated.

The results of that workshop, published by Afips, noted "by almost any standard the computer industry is maturing. Its volume of business is large, its ways of doing business fairly well established – and its growth rate has notably slowed.

"Yet for a mature economic sector the industry still lacks good definition and quantification," the report said.

Presently, "there are approximately 5,000 companies which to varying degrees, can be regarded as the suppliers in the computer industry," according to the report.

"The hardware subsector includes approximately 700 firms, the supplies subsector approximately 500 and the service subsector approximately 2,200.

"Major support subsectors such as electronic components, education and media suppliers contain approximately 1,000 firms. Other minor subsectors providing automated instrumentation equipment and process control devices total approximately 1,200," the report said.

'Modest' Expansion

Overall, the trends in most industry measuring areas (new build shipments, installed base growth and revenues) "indicate the computer industry will continue to expand, but at a more modest pace than in the past," the study found.

The value of "new build" shipments was placed at $5.1 billion for the domestic marketplace in 1971, and the estimate for 1976 was that shipments would be between $8.25 billion and $9.7 billion, an increase of 70% to 80%.

The installed base of equipment at the end of 1971 was placed at $30.9 billion and the 1976 estimate of the installed base was put between $40 billion and $57.5 billion, the Afips report related.

Afips indicated these estimates include almost all types of equipment, from general purpose computer systems through mini and dedicated computers to peripheral equipment.

Breaking down the figures, the domestic shipments of general-purpose computer systems were estimated at $4.2 billion in 1971 and forecast at about $7 billion to $7.75 billion for 1976.

The shipment rate of minis will grow from $250 million in 1971 to between $600 million and $750 million by 1976, the group estimated.

The report noted there were wide differences between the value of computer equipment installed and the number of machines installed.

For example, while large computer systems were by number only one-third of the 54,470 systems installed in 1971, they represented 75% of the value of the installed based.

On the other hand, minicomputers represented 30% of the number of systems installed and only accounted for 6% of the value of the installed base.

Afips included plug-compatible peripheral equipment with the figures for systems shipments.

"Seen in the context of the past, the growth rates for new build shipments and installed base projected for 1976 seem healthy but quite conservative," Afips noted, explaining that the growth was explosive between 1955 and 1968.

After a slump in the 1968-70 recession, "the 1970-71 figures and 1972 preliminary figures presage a resumption of growth, but it is too soon to observe whether or not the resumption will be at the prior high growth rates."

Afips said most observers "think not," because while there is still a U.S. demand for computer equipment, "there is no longer a vacuum to be filled" as there was in the past.

Revaluations Seen Helping U.S. Firms in Foreign Trade Efforts

NEW YORK – The recent dollar revaluations can only help U.S. DP firms increase the yield on sales and equipment rentals abroad, Patrick J. McGovern, president of International Data Corp., told industry representatives here recently.

Since export revenues in marks, pounds or francs are worth about 10% more than before, U.S. exporters have the option of lowering prices to expand their market share or maintaining equivalent local currency prices and receiving about 10% larger value, he noted.

The non-U.S. portion of the DP market has contributed over 50% of the total profits realized in the industry in the last two years, he said. For example, although 40% of IBM's revenue is from operations outside the U.S., that portion accounts for 55% of the firm's profits.

Balance of Payments

IDC figures estimated that the U.S. computer industry contributed about $1.2 billion to the 1972 balance of payments situation, McGovern said.

About $350 million to $400 million in earnings were repatriated last year, and value of shipments exported minus imports from U.S.-controlled plants abroad totaled about $800 million, he added.

"U.S.-based firms installed about $2.8 billion of equipment internationally in 1972, about two-thirds of which were built and installed outside the U.S.," he noted. In addition, he said, about $1 billion was actually exported from U.S.-based plants.

IBM World Trade Cuts Prices

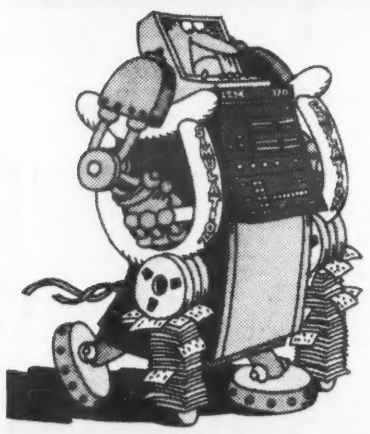
NEW YORK – IBM World Trade Corp. has reduced purchase and rental prices on the major part of its data processing systems product line and related equipment.

Among the countries affected are West Germany, France, Switzerland and Japan, a spokesman said.

"It was not a linear reduction," he explained, as price cuts varied from box to box and from country to country.

"IBM continuously evaluates its prices to ensure that the products are properly priced. After considering many variables such as cost of doing business, the effect of the international monetary situation on cost at various manufacturing locations, production status, IBM product relationships, etc., the present price changes have been initiated," he said.

Changes in purchase price were effective March 30, and rental rates April 1, he added.



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Europe Striving to Strengthen Own DP; Link With U.S. Group Seen Possible

By Molly Upton
Of the CW Staff

LONDON – The mounting pressure for Europe to have "at least one major computer group" was evidenced at recent hearings of the Commons Committee on Science and Technology.

Speaking of the need for a regrouping of European DP manufacturers, European Economic Commission official Christopher Layton observed the EEC would not exclude the possibility of a merger between an American and European group, but would insist there "be an element of powerful control within Europe."

As the European Commission is committed to ensure an open Common Market, current government policies of buying from national computer makers will not last indefinitely, Layton observed.

Also, despite government protection, none of the small, European-based producers of CPUs seems to be independently viable on a long-term basis, Layton said.

Viable Alternative

Thus, it is essential to develop strong competitive forces in which Europeans have a significant interest as an alternative to domination by IBM, he said.

A regrouping of the European industry is in order, he said, but cautioned that merging for the sake of merging would not solve the problem.

For instance, the combination of ICL, Siemens, AEG-Nixdorf, CII and Philips, which together have a revenue less than one-tenth that of IBM, might involve such high costs and great difficulties in combining different product lines and managements that the effect would be to increase IBM's share of the market.

However, companies supported by governments and institutions of the European Community should be urged toward a regrouping of the European-owned industry.

Manufacturers should find partners with complementary capabilities that would produce a merger resulting in economies of scale, while governments should exert "firm but sensitive pressure" on firms to combine, Layton said.

IBM, Honeywell Rap 'Buy Europe' Policies, Call Them Discriminatory

LONDON – Both Honeywell and IBM have criticized the current "discriminatory purchasing policies" designed to build a stronger European computer industry.

Testifying before the Committee on Science and Technology, Edwin Nixon, managing director of IBM UK, said that although IBM is popular in many parts of Europe, he doubted it was popular with the European Economic Commission itself, according to *The Financial Times.*

What About the User?

"Europe may well want to have a computer industry," he acknowledged, but "buy national" policies distort the market and thus are detrimental to the user, he said.

IBM employs 82,000 Europeans and manufactures 90% of products sold in Europe in European plants.

Clarence Spangle, executive vice-president of Honeywell Information Systems, described the UK's "buy ICL" (International Computers Ltd.) policy as a "double subsidy" for ICL.

He rapped the government for encouraging Honeywell to set up a plant in Scotland, and then pursuing the buy ICL policy.

Honeywell's business in the UK would be about 10% higher if allowed to compete freely for government business, he said.

Honeywell, he added, has reinvested all UK earnings, and returned no profits to the U.S. He also challenged the concept of nationality, noting Honeywell has more shares held in EEC nations than ICL.

Spangle suggested that European firms might be wiser to join with U.S. or Japanese firms, rather than with each other.

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Pitfalls Are Plenty When Components, Systems Makers 'Poach on Territory'

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – Over the past few years there has been some worry in the computer industry that components makers would begin moving into the low end of the computer manufacturing business.

And there has been an opposite worry that computer manufacturers would begin making more components on their own and therefore cut the component manufacturers' business.

Both these possibilities may yet happen, but there are many risks associated with them, according to Jim Geer, director of marketing for commercial systems at Fairchild Camera & Instrument.

Geer noted at a recent meeting here that component costs were dropping rapidly, while at the same time the number of functions on a chip was increasing, and the need for speed and additional functions was rising.

At the same time, most members of both market segments want to maximize the value they add to a product, which leads to more integrated manufacturing, he said.

These trends would tend to lead the components firms and the computer firms to begin "poaching" more and more on the other's territory, he said, but he warned there were a great many pitfalls along the way.

For example, the two industries, he said, are quite different. A firm should concentrate its energy in the areas it knows best instead of entering fields it is not particularly competent to deal with, he claimed.

In addition, sometimes letting someone else make a product is the cheaper way of doing the job when compared with in-house product development, he said.

If a components maker enters adjacent markets, it can sometimes lose some of its traditional customer base – customers who don't appreciate their former supplier competing with them, he added.

There are also problems for the computer companies which want to do more of their component manufacturing in-house, he noted.

Big Investment

It takes a great deal of investment in both research and capital equipment to get into that side of the market – particularly in the area of integrated circuits and semiconductors, he observed.

At the same time, computer companies should be aware that a great deal of technological obsolescence in the semiconductor business exists, since it means that their research costs will be high to keep up with the technology.

Marketing arrangements are also different in the semiconductor business, he added, pointing out that most sales are through a distributor network for the firm that could not use all of its capacity in-house.

Also, he claimed there is a long lead time between component announcement and volume deliveries in the semiconductor and components business, placing the figure between three and five years for most new devices.

On the other hand, the structure of the computer industry is foreign to the components and semiconductor manufacturers, he said.

There is better price stability, he stressed, in the computer end of the market, but this goes hand-in-hand with higher marketing cost for the products in that field.

And finally, he noted, the cost of software is an important consideration.

Markets Open

However, Geer stated, considerations of software and service are not as important in the "hot iron" segment of the computer market as they are in the end-user part of the business, and he indicated this is the one market segment where the components and semiconductor makers might be able to compete.

There are some other niches in the marketplace, he found, for the integrated circuit manufacturer, but these are limited and risky because of the high cost of service and support and the need for a large amount of capital for lease financing.

So "while there will be some poaching, many of those who poach will fail," he said.

At the same time, he said, computer makers and IC manufacturers should develop closer ties with each other to reduce development time for a new product or system.

By closer cooperation and joint development in some cases, he indicated, the computer equipment makers can incorporate the advanced products made by the semiconductor and integrated circuit makers into their products faster and therefore possibly get a jump on the competition.

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The State of California intends to release an Invitation For Bid (IFB 73-03) on April 16, 1973, for the new Stephen P. Teale Consolidated Data Center to be located in Sacramento, California. The purpose of IFB 73-03 is to elicit proposals for a prime contractor to implement the new center.

The IFB requires the prime contractor to assume responsibility for all aspects of the following, including the responsibility where subcontractors are involved: (a) supplying and installing new hardware and software to provide DP services for 34 State entities who now receive their DP services from 13 separate computers; (b) conversion of 6300 programs and 2800 data bases; (c) training of 150 to 200 Center personnel and up to 1100 departmental personnel; (d) project management.

The new Center must not have more than 3 CPU's, which are to process 100,000 jobs/month of which 80% will be submitted from remote locations. The services provided by the Center to the various State departments will include local and extensive remote batch processing and on-line update/inquiry and time-sharing.

Benchmarking of the specific proposed configurations for all qualified bids will be required and all work must be completed not later than December 1974. The IFB will be approximately 11,000 pages in length and costs $200 per copy in advance. Volume I can be obtained for $25.00 and defines the basic overall needs. Any person interested in obtaining a copy may do so by contacting Mr. Ira B. Isbell in writing, with a check for the required amount, at Stephen P. Teale Consolidated Data Center, Business & Transportation Agency, 1120 N Street, Room 2101, Sacramento, California 95814, not later than 12:00 Noon, April 15, 1973. The IFB must be picked up in Sacramento. Bids will be due by 2:00 p.m., July 16, 1973.

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3330 Double-Density Head Ready; Now Awaiting Drive Manufacturer

GOLETA, Calif. – Double-density 3330-type disk storage systems are now only a drive away. Information Magnetics Corp. is offering a double-density disk-recording head, the Infomag 4040NT, for use on IBM 3336-type removable disk pack systems.

At present the company is in small quantity production because no firm is yet marketing a double density 3330-type disk drive.

"Most of our production has gone to companies working on double-density drives," said Paul Coleman, a spokesman for the company, "but none of them have announced yet. It just may be that the companies are more interested in pushing single 3330-type drives since these aren't being sold in as great quantities as some people would like."

The double-density disk head's narrow-track design provides 384 track/in. with a recording density of 4040 bit/in., doubling the 3330-type system capacity.

Offered with related support assemblies, the 4040NT is mechanically compatible with the standard 3330-type head. The price will be under $500 for small quantities, Coleman said.

Information Magnetics Corp. is at 5743 Thornwood Drive.

Boothe, Rockwood Write Off 360s

Rockwood Computer Corp. and Boothe Computer Corp. have decided to reevaluate their computer holdings.

For Rockwood, the writeoff of $47.6 million before taxes will result in a loss of about $35 million for the year ending March 31. It's IBM 360 portfolio, after the revaluation, will have a net worth of about $11 million, Rockwood said.

Boothe's year-end report will show a special charge of about $35 million, which includes a $13 million reduction announced earlier, the company said.

Boothe added it doesn't expect to report a profit or loss from its 360 leasing business until net asset value is recovered in 1978.

Orders & Installations

The Federal Reserve Bank of Richmond, Va., has ordered a dual Contem 45 system for on-line transfer of funds and securities between Federal Reserves offices in neighboring states.

Trans World Airlines and Continental Airlines have ordered Di-An Controls' Series 8000 ticketing system. The system will be linked to the airlines' central computer which contains passenger reservation records and calculates fares.

Gulf Oil Corp. has ordered dual Teleswitcher 510 communications control and message switching systems from Teleswitcher Corp. The two systems will be used to control message traffic over Gulf's private communications network.

Sunnyland Packing Co. has installed an NCR Century 200 to handle inventory control, invoicing and payroll for its meat-packing operations.

Sage-Allen & Co. has ordered a CS-1400 Credit Authorization System from Datatrol Inc. to be used in Sage's nine specialty department stores.

Nasa has ordered a Xerox Sigma 5 for use in its Atmosphere Explorer satellite program.

The Hartford National Corp. has installed Trilog Associates' PSS system for participant accounting for employee benefit plans.

Holly Stores Inc., women's apparel division of S.S. Kresge Co., has installed Dennison's Meritag ticketing and data retrieval system.

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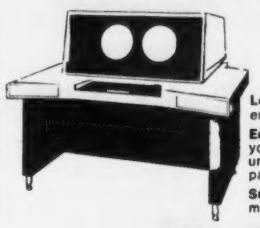

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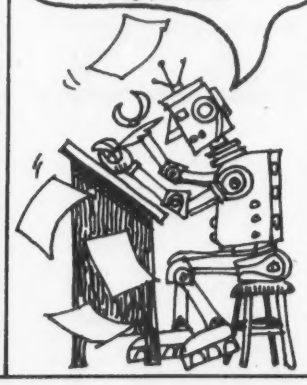

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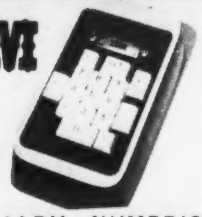

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Investors See Steady Profit Pace for IBM

By Molly Upton
Of the CW Staff

NEW YORK – IBM should continue its five-year pace of 24% to 26% pretax profit margin, despite several factors affecting the current IBM scene, according to a panel of "IBM watchers" at the Sixth Annual Institutional Investors Conference here.

Panelists agreed that a consent decree would likely result from the Justice Department suit, and generally discounted any ill effects for IBM.

James Peterson of Investors Diversified Services, Inc. did mention, however, that a requirement to divest itself of its components division could seriously hamper IBM's earnings prospects. But he said he didn't see this as a likely occurrence.

He also noted that if IBM divested itself of some of the more "peripheral" areas, such as Science Research Associates, which produce lower profit margins than the DP Division, this would be to IBM's benefit, and might well satisfy the Justice complaint.

The four panelists unanimously agreed that the foreign segment is a key factor in future earnings, and noted the increasing contribution to earnings, from 32% in 1967 to 54% in 1972.

William S. Deakyne of Chemical Bank said the foreign segment could conceivably account for two-thirds of earnings by 1980.

A very real question, though, is market potential, according to John L. Rutledge of Cyrus J. Lawrence & Sons.

However, there are real needs for more DP applications, and for improved applications, he observed.

"DP is still in its infancy in terms of what it does for people," he said.

Communications Demands

In addition, he said, the move to source data automation will entail increased development in the telecommunications area, and involves sophisticated systems work, so the field will likely be held predominantly by the big firms, he noted.

Examining the Justice suit, Rutledge observed that "the government was in a tough position, because in many ways it is not in the government's interest to be too punitive toward IBM.

"After all," he noted, "IBM is one of our major supporters of our balance of trade position."

Peterson pointed out that the Justice Department hasn't asked for divestiture of the components division, but that it was a key proposal for structural relief put forth by Control Data in its suit against IBM, and may have been "a significant reason for the very liberal settlement with CDC on the suit.

"On the surface, the consent decree could look very good for the Justice Department, be very meaty, have a lot of negative things for IBM, but I don't really think the end result will hurt IBM any more than the 1956 Consent Decree," Peterson said.

In arriving at their estimates for margin growth, the panel cited various supporting factors.

Rutledge noted that although the buying spree that occurred when leasing companies bought 360s at the end of the production run boosted margins to 27% to 28% – even in 1972, when there were "many problems" – IBM managed a 25% to 26% margin.

Steady as She Goes

He noted IBM has "good controls," and saw the same range of margin as over the last five years, 22% to 26.5%.

Peterson said he thinks "we're going to be constantly surprised that margins are on the upside." He stressed the positive effect selective divestiture could have, and that management has "better control than it has had in the past and the economy is strong now . . . "

Daniel Mandresh of Alliance One Institutional Services, Inc. said he thinks IBM is expecting margins to hold about level for this year, as it did last year.

He was a little more optimistic, and said if one segregated the "enormous other income account" totaling $200 million, considering the cost constraints in effect at IBM, one could see operating margins on the level of those in the 1968 to 1969 time frame."

This, with an "associated continual growth in the other income account, worth about 2% margin, gets us to the 28% level," Mandresh said.

Deakyne took another approach, separating foreign growth from domestic growth. IBM roughly makes about 20% pretax in the domestic market and 30% in the foreign market, he noted.

The foreign margin peaked, in his opinion, in 1970, at 34%. IBM is very cautious about the labor situation abroad, he said, and "business has grown a lot faster than IBM anticipated, so they got a lot of utilization out of not enough plant, possibly," and it is likely overhead will increase, he said.

"Whereas domestically I think the company is in a position to increase its margins over the next couple of years, the key variable to watch is the foreign side. If those foreign margins start to track down to the 25% level, I think margins as a total may go nowhere," Deakyne said.

But on the whole, he said, he thought there was room for some margin improvement.

New IBM Lease... Is 'What You See What You Get'?

NEW YORK – Does the saying "what you see is what you get" apply to the new IBM 48-month lease plan? Is IBM planning to move toward more of a purchase rather than rental base? What are the implications of this plan for IBM's future strategy?

These were some of the questions discussed by panelists at the recent Sixth Annual Institutional Investors Conference.

William S. Deakyne said that although there are many possible ways to look at the plan, one cannot really judge the impact until later, when it is clear who signs for the plan, and how strongly IBM markets it.

Superficially, the plan could indicate that IBM thinks the virtual memory equipment is going to be around for four years, he observed.

"Or in fact, maybe IBM doesn't think the stuff is going to last four years, but they'd like to have a lot of control over the rental base four or five years from now when they might be ready to obsolete this equipment," Deakyne said.

Too much significance should not be attached to the announcement of the 48-month plan, James Peterson cautioned.

Daniel Mandresh noted that from a legal standpoint, IBM was the only mainframe maker that previously did not offer long-term commitments. If one considers the move as a "locked-in lease, in the framework of locking out competitive activity," this could indicate IBM feels quite confident in its ability to perpetuate the policy, he added.

But John L. Rutledge said: "It may be the opening of a possible way of getting a consent decree."

What the 48-month plan really is doing "is putting IBM on a similar footing with the rest of the competition," he added.

Mandresh added that he thinks IBM doesn't expect the 48-month plan to be that successful but views it as a base to give it "flexibility in future strategy."

IBM may be aiming toward a large purchase base by the end of four years. It may be "expanding its plans to protect against leasing company returns, which has really not become much of a problem yet. However, in the 1974-75 time frame one can visualize a fairly heavy number of these coming back."

Deakyne said he thinks IBM is still rental-oriented. "I think the company has been taking steps to prevent purchases from getting out of hand. I think they want to keep this under control, and I think they can live with 15% purchase content."

Rutledge said maintenance of a rental base is no longer as important to IBM as it was in the days when the keypunch constituted most of the business.

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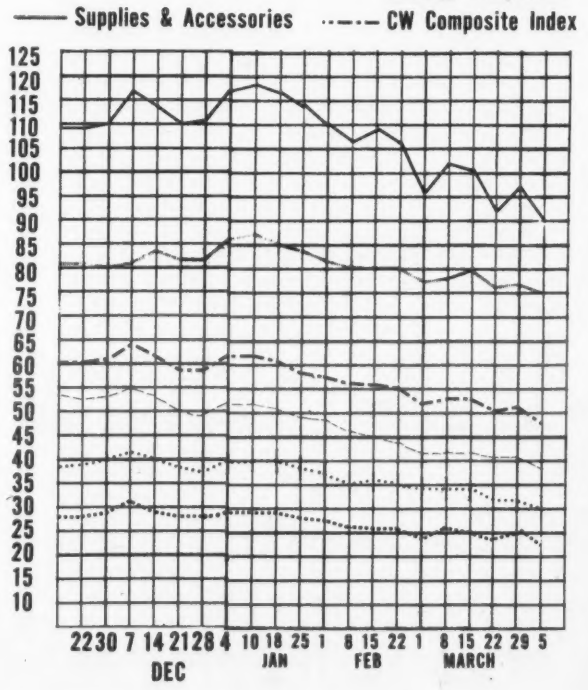
CLOSING PRICES THURSDAY, APRIL 5, 1973

E X C H		1972-73 RANGE (1)	CLOSE APR 5 1973	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 3	1 1/4	- 1/8	-9.0
A	APPLIED DATA RES.	3- 7	3	- 1/4	-7.6
O	APPLIED LOGIC	1- 4	2 1/8	- 3/8	-15.0
N	AUTOMATIC DATA PROC	65- 99	69 1/8	-6 1/8	-8.1
O	BRANDON APPLIED SYST	1- 2	5/8	0	0.0
O	COMPUTER DIMENSIONS	3- 14	3	0	0.0
O	COMPUTER DYNAMICS	1- 4	3/4	- 1/8	-14.2
O	COMPUTER NETWORK	2- 7	1 3/4	0	0.0
N	COMPUTER SCIENCES	3- 10	3 5/8	- 1/4	-6.4
O	COMPUTER TASK GROUP	1- 2	1 1/2	+ 1/8	+9.0
O	COMPUTER TECHNOLOGY	2- 8	2 3/4	- 3/8	-12.0
O	COMPUTER USAGE	5- 14	5 3/4	0	0.0
O	COMRESS	1- 3	5/8	- 1/8	-16.6
O	COMSHARE	5- 10	6	- 3/8	-5.8
N	CORDURA CORP	6- 28	6 3/8	- 7/8	-12.0
O	DATATAB	3- 9	2 3/4	- 1/2	-15.3
O	EDP RESOURCES	1- 8	1 1/2	- 1/8	-7.6
A	ELECT COMP PROG	1- 5	1 1/8	0	0.0
N	ELECTRONIC DATA SYS.	43- 65	42 3/4	-3	-6.5
O	INFORMATICS	3- 11	3 1/2	- 1/4	-6.6
O	I.D.A. DATA CORP	1- 3	3/4	0	0.0
O	KEANE ASSOCIATES	4- 7	3 1/4	- 1/4	-7.1
O	KEYDATA CORP	7- 13	7	- 1/4	-3.4
O	LOGICON	4- 9	4 5/8	- 5/8	-11.9
A	MANAGEMENT DATA	2- 10	2 1/2	0	0.0
O	NATIONAL CSS INC	8- 41	21	-10 1/2	-33.3
O	NATIONAL INFO SRVCS	1- 5	1 5/8	+ 1/8	+8.3
P	ON LINE SYSTEMS INC	5- 19	14 7/8	-1	-6.2
N	PLANNING RESEARCH	3- 17	3 1/2	- 1/4	-6.6
O	PROGRAMMING METHODS	20- 25	22 1/2	0	0.0
O	PROGRAMMING & SYS	1- 2	3/4	0	0.0
O	RAPIDATA INC	5- 27	13	-3 1/4	-20.0
O	SCIENTIFIC COMPUTERS	1- 4	1 1/8	- 1/8	-10.0
O	SIMPLICITY COMPUTER	1- 5	1 7/8	+ 1/8	+7.1
O	TBS COMPUTER CENTERS	3- 6	2 7/8	0	0.0
O	TCC INC	1- 3	1/2	0	0.0
O	TYMSHARE INC	7- 12	7 5/8	- 1/8	-1.6
O	UNITED DATA CENTER	5- 8	5	- 1/4	-4.7
N	UNIVERSITY COMPUTING	7- 26	9 3/8	-1 3/8	-12.7
A	URS SYSTEMS	5- 10	5 3/8	- 3/8	-6.5
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	20- 49	20	- 1/4	-1.2
O	ADVANCED MEMORY SYS	12- 23	14 1/8	-2 5/8	-15.6
N	AMPEX CORP	5- 15	5	- 1/4	-4.7
O	ANDERSON JACOBSON	4- 8	5 1/2	- 1/4	-4.3
O	BEEHIVE MEDICAL ELEC	1- 9	8 3/4	- 3/8	-4.1
A	BOLT,BERANEK & NEW	5- 21	8 7/8	- 5/8	-6.5
N	BUNKER-RAMO	6- 14	6 1/8	- 3/8	-5.7
A	CALCOMP	9- 25	10 1/2	- 3/8	-3.4
O	CAMBRIDGE MEMORIES	9- 15	10 3/4	- 3/8	-3.3
O	CENTRONICS DATA COMP	6- 28	19 1/4	-2 1/4	-10.4
O	CODEX CORP	6- 25	12 1/2	0	0.0
O	COGNITRONICS	1- 5	1 5/8	- 1/4	-13.3
O	COMPUTER COMMUN.	1- 7	2 1/4	- 1/8	-5.2
A	COMPUTER EQUIPMENT	2- 4	2 3/8	- 1/8	-5.0
O	COMPUTER MACHINERY	7- 13	8 7/8	-1	-10.1
O	COMPUTER TRANSCEIVER	2- 9	2 5/8	+ 1/8	+5.0
A	COMPUTEST	3- 9	4 1/2	0	0.0
N	CONRAC CORP	23- 39	23	- 3/8	-1.6
A	DATA PRODUCTS CORP	3- 7	3	- 1/8	-4.0
O	DATA RECOGNITION	1- 5	2 1/2	0	0.0
O	DATA TECHNOLOGY	2- 5	3	- 1/4	-7.6
O	DI/AN CONTROLS	3- 8	2 3/4	0	0.0
N	ELECTRONIC M & M	3- 8	3 5/8	0	0.0
O	FABRI-TEK	2- 5	3 1/4	- 1/8	-3.7
O	GENERAL COMPUTER SYS	6- 16	7	0	0.0
N	GENERAL ELECTRIC	59- 74	61 5/8	-3 5/8	-5.5
N	HAZELTINE CORP	7- 13	7 1/8	- 5/8	-8.0
O	INFOREX INC	14- 36	13 5/8	- 3/8	-2.6
O	INFORMATION DISPLAYS	1- 5	3/4	0	0.0
O	INFORMATION INTL INC	8- 25	11 3/4	- 1/4	-2.0
A	LUNDY ELECTRONICS	6- 14	6 1/4	- 1/8	-1.9
O	MANAGEMENT ASSIST	1- 1	3/8	0	0.0
A	MILGO ELECTRONICS	15- 44	21	-1 5/8	-7.1
N	MOHAWK DATA SCI	6- 27	6 3/8	+ 3/8	+6.2
O	ODEC COMPUTER SYST.	3- 12	3 3/4	- 1/4	-6.2
O	OPTICAL SCANNING	2- 16	5 1/4	0	0.0
O	PERTEC CORP	5- 17	5 5/8	- 3/4	-11.7
O	PHOTON	3- 15	3 3/4	(SUSPENDED)	
A	POTTER INSTRUMENT	5- 21	5 1/4	- 3/8	-6.6
O	PRECISION INST.	2- 13	2 3/4	- 3/4	-21.4
O	RECOGNITION EQUIP	5- 15	4 3/4	- 3/4	-13.6
N	SANDERS ASSOCIATES	10- 21	9 1/2	- 1/2	-5.0
O	SCAN DATA	2- 13	2 3/8	0	0.0
O	STORAGE TECHNOLOGY	17- 39	20 3/4	-2 1/2	-10.7
O	SYCOR INC	7- 11	10 1/4	- 1/2	-4.6
O	TALLY CORP.	6- 15	5 7/8	-1 3/8	-18.9
N	TEKTRONIX INC	34- 64	36 1/4	-5 3/8	-12.9
N	TELEX	4- 15	3 7/8	-1 1/8	-22.5
O	WILTEK INC	10- 26	12	-2 1/4	-15.7
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	5- 9	7	+ 1/4	+3.7
A	BARRY WRIGHT	9- 14	8 3/4	-1	-10.2
A	DATA DOCUMENTS	17- 26	18 3/4	- 1/4	-1.3
O	DUPLEX PRODUCTS INC	8- 16	8 1/4	+ 1/4	+3.1
N	ENNIS BUS. FORMS	6- 10	5 7/8	- 1/4	-4.0
O	GRAHAM MAGNETICS	15- 27	14 1/2	-1 3/4	-10.7
O	GRAPHIC CONTROLS	10- 15	10 1/4	+ 1/8	+1.2
N	3M COMPANY	76- 88	81 1/4	-4 1/4	-4.9
O	MOORE CORP LTD	42- 59	58 3/8	+ 1/2	+0.8
N	NASHUA CORP	48- 62	48	-2	-4.0
O	REYNOLDS & REYNOLD	37- 77	45 1/2	- 1/2	-1.0
O	STANDARD REGISTER	14- 20	17 1/2	0	0.0
O	TAB PRODUCTS CO	14- 23	14	-1 1/2	-9.6
N	UARCO	19- 28	18 7/8	-1 1/8	-5.6
A	WABASH MAGNETICS	6- 11	6 1/4	- 1/8	-1.9
N	WALLACE BUS FORMS	21- 26	22	-1 3/8	-5.8
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	147-244	221 5/8	-18 1/8	-7.5
N	COLLINS RADIO	14- 27	22	-2 3/4	-11.1
N	CONTROL DATA CORP	42- 78	44 1/4	-1 5/8	-3.5
O	DATA GENERAL CORP	36-131	37 1/4	-3 1/4	-8.0
O	DIGITAL COMP CONTROL	3- 25	3 1/8	- 1/8	-3.8
N	DIGITAL EQUIPMENT	72-105	80 3/4	- 1/2	-0.6
N	ELECTRONIC ASSOC.	6- 13	6 1/2	+ 1/4	+4.0
A	ELECTRONIC ENGINEER.	6- 14	9 1/4	- 5/8	-6.3
N	FOXBORO	23- 41	25 5/8	- 7/8	-3.3
O	GENERAL AUTOMATION	13- 55	29 1/2	-4 1/2	-13.2
O	GRI COMPUTER CORP	1- 5	1 1/8	- 5/8	-35.7
N	HEWLETT-PACKARD CO	46- 94	81 3/8	-4 1/8	-4.8
N	HONEYWELL INC	106-170	115	- 1/4	-0.2
N	IBM	333-451	422 7/8	-15 7/8	-3.6
O	INTERDATA INC	7- 16	8 1/2	-1	-10.5
N	MEMOREX	7- 38	7 1/8	-1 3/8	-16.1
O	MICRODATA CORP	5- 10	7 1/4	0	0.0
N	NCR	27- 38	28 7/8	-2	-6.4
N	RAYTHEON CO	27- 47	28 7/8	-1 1/4	-4.1
N	SPERRY RAND	30- 50	40 3/4	-3 5/8	-8.1
A	SYSTEMS ENG. LABS	4- 16	4 3/4	- 3/8	-7.3
N	VARIAN ASSOCIATES	14- 22	13 1/2	-1 1/2	-10.0
N	WANG LABS.	18- 61	18 7/8	-1 1/8	-5.6
N	XEROX CORP	121-172	147 5/8	-6 5/8	-4.2
	LEASING COMPANIES				
A	BOOTHE COMPUTER	3- 18	2 1/2	- 1/2	-16.6
O	BRESNAHAN COMP.	1- 3	1 1/8	0	0.0
O	COMDISCO INC	3- 18	12 1/8	-1 1/8	-8.4
O	COMMERCE GROUP CORP	4- 11	4 1/8	- 1/4	-5.7
O	COMPUTER EXCHANGE	1- 3	5/8	0	0.0
A	COMPUTER INVSTRS GRP	4- 14	4	- 3/8	-8.5
O	COMP. INSTALLATIONS	2- 5	2	0	0.0
N	DPF INC	5- 13	6 1/8	- 1/2	-7.5
M	DATRONIC RENTAL	2- 4	2	- 1/8	-5.8
A	DCL INC	2- 10	1 3/4	+ 1/8	+7.6
A	DEARBORN-STORM	16- 26	15 5/8	-2 3/8	-13.1
A	DPA, INC.	5- 8	6	0	0.0
A	GRANITE MGT	4- 11	3 3/4	- 5/8	-14.2
A	GREYHOUND COMPUTER	4- 11	4 1/8	- 5/8	-13.1
A	ITEL	7- 12	7 3/8	- 1/2	-6.3
N	LEASCO CORP	11- 24	10 7/8	-1 1/2	-12.1
O	LEASPAC CORP	6- 15	7 1/4	- 1/4	-3.3
O	LECTRO MGT INC	1- 4	1 1/8	+ 1/8	+12.5
A	ROCKWOOD COMPUTER	2- 7	1 5/8	0	0.0
O	SYSTEMS CAPITAL	3- 20	6 7/8	-2 1/8	-23.6
N	U.S. LEASING	19- 35	24 1/2	+ 1/8	+0.5

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
***** PLEASE SEND THE FOLLOWING OUTPUT TO:

Computer Stocks Trading Index



Earnings Reports

URS SYSTEMS
Three Months Ended Jan. 31

	1973	a1972
Shr Ernd	$.15	$.07
Revenue	6,781,000	6,088,000
Spec Cred	b99,000	.....
Earnings	503,000	252,000

a-Restated. b-Consists of settlement of some notes from Remote Computing Corp. and recognition of an installment payment on the sale of Rocky Mountain Airways.

DOCUTEL
Year Ended Dec. 31

	1972	1971
Shr Ernd	$1.78	.....
Revenue	23,691,000	$7,112,000
Spec Item	a2,025,000	d3,457,000
Earnings	4,222,000	(6,026,000)
3 Mo Shr	.74	.....
Revenue	8,115,000	3,368,000
Spec Cred	a901,000	.....
Earnings	1,881,000	(315,000)

a-Tax loss carryforward credit. d-Debit; writeoff of deferred research and development expenses.

WALLACE BUSINESS FORMS
Three Months Ended Jan. 31

	1973	1972
Shr Ernd	$.36	$.28
Revenue	10,552,000	9,234,000
Earnings	657,000	508,000
6 Mo Shr	.69	.55
Revenue	19,835,000	17,590,000
Earnings	1,247,000	990,000

GENERAL AUTOMATION
Three Months Ended Jan. 31

	1973	1972
Shr Ernd	$.34	$.23
Revenue	6,182,000	3,631,000
Tax Cred	250,000	197,000
Earnings	726,000	402,000
6 Mo Shr	.68	.36
Revenue	12,064,000	6,508,000
Tax Cred	586,000	302,000
Earnings	1,451,000	611,000

TRATEC
Nine Months Ended Jan. 31

	1973	1972
Shr Ernd	$.15	$.11
Revenue	467,900	252,200
Tax Cred	.....	9,700
Earnings	54,100	39,800

SANGAMO ELECTRIC
Year Ended Dec. 31

	1972	1971
Shr Ernd	$1.43	.....
Revenue	87,239,000	$82,462,000
Spec Chg	.....	d1,685,000
Earnings	3,881,000	(771,000)

d-From sale of Transitel Computer Support Systems Division, related writeoff of certain assets and satisfaction of commitments.

COMPUTER MACHINERY
Year Ended Dec. 31

	1972	1971
Revenue	$29,616,000	$8,885,000
Spec Cred	a168,000	.....
Loss	1,954,000	6,790,000
3 Mo Shr	.08	.....
Revenue	10,275,000	1,903,000
Spec Cred	a61,000	.....
Earnings	373,000	(3,745,000)

a-From sale of securities.

COMPUTER TRANSCEIVER SYSTEMS
Nine Months Ended Nov. 30

	1972	1971
Shr Ernd	$.11	.....
Revenue	1,959,000	$1,317,400
Tax Cred	42,500	.....
Earnings	100,000	(87,600)

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